

UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF NORTH CAROLINA
ASHEVILLE DIVISION

STATE OF NORTH CAROLINA)	
ex rel. Roy Cooper,)	
Attorney General,)	
)	
Plaintiff,)	No. 1:06-CV-20
)	
vs.)	VOLUME 1B
)	(Pages 136-267)
TENNESSEE VALLEY AUTHORITY,)	
)	
)	
Defendant.)	
_____)	

TRANSCRIPT OF TRIAL PROCEEDINGS
BEFORE THE HONORABLE LACY H. THORNBURG
UNITED STATES DISTRICT COURT JUDGE
JULY 14th, 2008

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BROCK NICHOLSON - CROSS

1 MONDAY AFTERNOON, JULY 14, 2008

2 MS. COOPER: Your Honor, may I continue?

3 THE COURT: Yes.

4 BROCK NICHOLSON

5 CROSS EXAMINATION (Cont'd.)

6 BY MS. COOPER:

7 Q. Before the break, Mr. Nicholson, we were talking about
8 air quality standards, and I have a couple of questions to ask
9 you.

10 A. Okay.

11 Q. Isn't it true that the goal of North Carolina's
12 regulation of pollution under the Clean Air Act is
13 fundamentally to protect public health?

14 A. And welfare.

15 Q. So the answer is yes and no?

16 A. Yes, public health and welfare, that's correct.

17 Q. And the State of North Carolina implements a regulatory
18 program that protects public health by assuring that the
19 ambient air quality standards are attained and maintained;
20 isn't that true?

21 A. The ambient air quality standards are certainly a
22 benchmark or a goal and item that we have to address in our
23 federal implementation plan that is submitted to EPA and we
24 have to design a strategy to do that. I think clearly with
25 the recent standards that EPA has issued with --

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1 Q. Well, before you go on to the standards that EPA has
2 issued, I'd like to ask you to take a look at Page 53 of your
3 April 2000 deposition. And take a look at lines 9 through 14
4 and 15.

5 And during your deposition you were asked, "So the State
6 of North Carolina sets ambient air quality standards for
7 various kinds of pollutants?

8 "Yes."

9 A. Yes.

10 Q. "And then implements a regulatory program that protects
11 public health by assuring that those standards would be
12 attained.

13 "Answer: That's correct."

14 A. Right.

15 Q. "And maintained."

16 A. Right.

17 Q. Wasn't that your answer?

18 A. It is.

19 Q. And that's true today, isn't it?

20 A. That is true today, however --

21 Q. I have another question.

22 A. May I finish?

23 MR. GULICK: Objection.

24 THE COURT: Let the witness finish his answer. Go
25 ahead.

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1 THE WITNESS: I think, as we look at these standards
2 as an air quality management plan for the state, we realize
3 that we're dealing with standards that no longer have a
4 threshold below which there's not -- there's no longer need
5 for protection of public health. So I think our view is a
6 little amended now in the standards. And certainly they're a
7 requirement -- federal requirement. We have to develop plans,
8 submit them to the EPA to be approved relative to the official
9 federal standard. But whether or not that constitutes our
10 belief and policy that it's the limit on controlling for
11 protection of public health and welfare, I think that's a
12 policy that's getting outdated quickly, quite honestly.

13 Q. But you agree --

14 A. But we don't have to have -- I mean -- excuse me. We
15 don't have to have ambient air quality standards to have
16 regulations that go below those or even standards in the
17 associated designations of nonattainment in order to put
18 forward an emissions control regulation. Great examples are
19 the Clean Smokestacks Act which apply in areas not designated
20 as nonattainment and we have an inspection and maintenance
21 program that we expanded in the areas as a major theme of our
22 control strategy that doesn't rely on a designation related to
23 an ambient air quality standard.

24 Q. Well, at your deposition you said, when asked that
25 question, that's correct and there was no buts, ands, ifs,

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1 howevers, amendments.

2 A. And I certainly agree. And that was over a year ago; and
3 quite honestly, as EPA keeps promulgating these standards, our
4 view of the appropriate state policy is, quite frankly, being
5 amended. My view is.

6 Q. Your view. But the state hasn't actually lowered its
7 ambient air quality standards, has it?

8 A. We have not. As I said earlier, that would be a major
9 policy decision on the part of the state. It would take a lot
10 of resources, in fact, to do that of very questionable value
11 such as placing us in the awkward position of having standards
12 inconsistent with all the other states and --

13 Q. So it would be of questionable value to lower the
14 standards to protect public health?

15 A. At this time in the face of having an adequate control
16 strategy to lower emissions.

17 Q. Let me ask you, Mr. Nicholson. You testified about the
18 Clean Smokestacks Act. And I believe you said something to
19 the effect that the -- one of the center pieces of the Act was
20 the surrender of allowances by Duke and Progress. Can you
21 tell me how many allowances Duke has surrendered under the
22 Act.

23 A. They have not actually surrendered any yet because we
24 haven't --

25 Q. Okay. What about Progress?

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1 A. The same answer. They haven't gotten to the point of
2 having created any yet.

3 Q. They haven't created any under the Smokestacks Act, is
4 that what you're --

5 A. Well, actually, a minor amount as an interim requirement
6 of going below 35 in this case, and 25, we haven't actually
7 received them yet.

8 Q. So from 2002 to the present, there's been no surrender of
9 allowances.

10 A. That's right. But to our knowledge, there hasn't been
11 any other use by the two companies of those credits either.

12 Q. Of course, it doesn't cover them in their other states of
13 operation, does it?

14 A. The Clean Smokestacks Act applies in North Carolina.

15 Q. Yes.

16 A. Only.

17 Q. Now, I believe you testified that in 2001 and 2002,
18 around the time the Smokestacks Act was being developed and
19 enacted, that there were no scrubbers in operation at either
20 of the two big utilities in North Carolina; isn't that right?

21 A. That is correct.

22 Q. Do you know how many scrubbers TVA had in operation at
23 that time?

24 A. My understanding was six.

25 Q. Do you know how many TVA had planned at that time?

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1 A. I am not aware of that.

2 Q. Well, I'd like to --

3 A. Unless that's the five additional ones at that point that
4 were talked about.

5 Q. Yes.

6 A. Okay.

7 Q. And was that -- did you learn about that in about October
8 of 2001?

9 A. I quite honestly don't remember when I learned about
10 that, but I've heard about it for a good while.

11 Q. All right. I'd like you to take a look at what's been
12 marked Defendant's Exhibit 45. Can you identify that
13 document.

14 A. Looks like a -- it's an e-mail that was sent from Hawley
15 Truax to Allen Klimek and myself which is forwarding an e-mail
16 from -- it's a little hard to read, but from James McCarter to
17 Governor Easley.

18 Q. And if you take a look at the e-mail that was forwarded,
19 you'll see that it talks about TVA's decision to design, build
20 and operate five flue gas desulfurization systems or
21 scrubbers.

22 A. Yes.

23 Q. And then it goes on to mention that one of those
24 scrubbers will be on the Bull Run plant and two will be on the
25 Kingston plant; isn't that correct?

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- 1 A. I'm looking for Kingston.
- 2 Q. It's on the second page.
- 3 A. Okay.
- 4 Q. At the top.
- 5 A. Okay. I see it now.
- 6 Q. Now, isn't it true that Bull Run and Kingston are two of
- 7 the three Tennessee TVA plants closest to the North Carolina
- 8 border?
- 9 A. That's my understanding, yes.
- 10 Q. So in 2001 before the Smokestacks Act was passed, TVA
- 11 announced, said that it was going to build scrubbers at five
- 12 different places; isn't that right?
- 13 A. That's what we understand by this. Again, planned to
- 14 build.
- 15 Q. Well, hasn't TVA built a scrubber at Bull Run?
- 16 A. I don't personally know that, but I've been told that
- 17 scrubbers are being built.
- 18 Q. Well, do you have any reason to think they're not being
- 19 built?
- 20 A. Well, I'm aware that plans have changed over time, both
- 21 schedules and locations of scrubbers. I think that's really
- 22 one of the issues we have here is that --
- 23 Q. Well, let's --
- 24 A. -- how definite are these plans and how enforceable are
- 25 they?

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1 Q. How can you tell -- I'm, sorry that's a little
2 argumentative.

3 Do you know about the scrubbers at Kingston? Do you know
4 how far along they are?

5 A. I'm not specifically familiar.

6 Q. Do you know anything about the scrubber that's mentioned
7 here at Paradise?

8 A. I'm sorry, what location?

9 Q. If you take a look down on about the fifth line, fourth
10 or fifth line, Page 2.

11 A. Okay.

12 Q. It talks about a scrubber at Unit 3 at Paradise Fossil
13 plant in Kentucky.

14 A. I see that.

15 Q. Do you know anything about that scrubber?

16 A. I do not personally or specifically.

17 Q. So your testimony is you don't really have any personal
18 knowledge of the progress of TVA's plans or the progress of
19 TVA's actions in controlling emissions as we stand here and
20 sit here.

21 A. What I do know as of this month that there are actually
22 only seven scrubbers in operation in the TVA system.

23 Q. That's not what I asked you.

24 A. Well, I do not know the status of ones beyond the seven.
25 And I do understand that there is construction underway,

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1 but -- in some units and I don't have the specifics of that.

2 Q. Did you have specifics in 2001 about TVA's plans?

3 A. Well, apparently I obviously received a copy of this and
4 had -- and to be honest, I was aware that EPA -- or TVA's
5 talked about five additional scrubbers for a considerable
6 period of time.

7 Q. Well, if it came to your attention that the Bull Run
8 scrubber was actually completed, would that surprise you?

9 MR. GULICK: Object to the form of the question.

10 A. Well, I am aware that there is a seventh scrubber --

11 THE COURT: Overruled. Go ahead.

12 THE WITNESS: Excuse me, sir.

13 THE COURT: You may answer.

14 THE WITNESS: I am aware that there is a seventh
15 scrubber in operation and I don't recall exactly which
16 location -- what location that is.

17 Q. Well, are you aware of when TVA's eighth scrubber is
18 projected to go online?

19 A. I don't recall the exact date.

20 Q. Do you recall the year?

21 A. I do not recall the year.

22 Q. Isn't it true, Mr. Nicholson, that in 2002 you met with
23 some TVA representatives to talk about their plans for
24 controlling emissions?

25 A. I believe that's correct.

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1 Q. And do you recall what they told you at that time?

2 A. As I recall, there was discussion about tons of emissions
3 and the progress TVA is making or planning to make.

4 Q. Okay.

5 MS. COOPER: Before we go further on that, I'd like
6 to move into evidence Exhibit -- Defendant's Exhibit 45.

7 MR. GULICK: Objection.

8 Your Honor --

9 THE COURT: Yes, I've got your objection. I'll rule
10 on it shortly.

11 MR. GULICK: Okay.

12 (Pause.)

13 THE COURT: I'll overrule that. Go ahead.

14 MS. COOPER: Thank you, Your Honor.

15 (Defendant's Exhibit Number 45 was received into
16 evidence.)

17 Q. Mr. Nicholson, you testified on direct about reports that
18 DENR submits to the Environmental Review Commission and the
19 Joint Legislative Utility Review Committee under the
20 Smokestacks Act, correct?

21 A. Correct.

22 Q. And I'd like you to take a look at a portion of the
23 report that's dated May 30th, 2003. It's Defendant's Trial
24 Exhibit 46. And I'd like to direct your attention to the
25 third page of that exhibit which has got a number on the

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1 bottom ending in 09.

2 A. Okay.

3 Q. And let's take a look at the third paragraph on the page
4 about a meeting that we were just talking about. Do you
5 recall that -- what was discussed at that meeting in August of
6 2002?

7 A. My recollection is this is consistent with the items
8 discussed at that meeting.

9 Q. I'm sorry?

10 A. My recollection is what I'm reading here is consistent
11 with what I recall from that meeting, yes.

12 Q. So in addition to the scrubbers, TVA told you that it
13 would have 25 boiler units controlled by 2005 with SCR; is
14 that correct?

15 A. I don't see the reference to SCR on there. It says, "TVA
16 plans to have 25 boiler units" --

17 Q. The prior sentence says, "Regarding NOx control, TVA is
18 on schedule to have the first eight of its selective catalytic
19 reduction systems in place.

20 A. I see that.

21 Q. Then it goes on to talk about 25.

22 A. Okay.

23 Q. So in 2002 TVA told you that it had plans to build
24 some -- build five more scrubbers and a lot of SCRs; isn't
25 that right?

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1 A. That's what I understand, yes.

2 Q. Do you have any idea as we -- as we sit here and stand
3 here today how many of those have been completed, either
4 scrubbers or SCRs?

5 A. My understanding on scrubbers is that there are a total
6 of seven that have been completed and in operation, I think
7 counting the original six. To be honest, I don't know how
8 many remaining ones are under construction or ready to go
9 online.

10 Q. How about scrub -- how about SCRs?

11 A. SCR, I do not recall or am aware of the exact status of
12 the SCR or NOx control units.

13 Q. In 2002 did Tennessee have a Clean Smokestacks Act?

14 A. Not to my knowledge.

15 Q. Did Kentucky?

16 A. Not to my knowledge.

17 Q. Did Alabama?

18 A. No.

19 Q. But TVA had plans to put in scrubbers and SCRs even
20 though there was no Smokestacks Act in the states that it
21 operated in; isn't that correct?

22 A. Well, there is an understanding that NOx SIP Call was a
23 driver to a lot of NOx controls in each of the states covered
24 by that through federal provision, including the states that
25 you've listed, including North Carolina. And that I

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1 understand TVA had six scrubbers already in place and that
2 there were plans for more.

3 Part of the issue in our discussing or having meetings
4 after the Clean Smokestacks Act with Tennessee and other
5 states was to try to encourage a similar bill requiring these
6 controls on a specific schedule.

7 Q. I understand. There was a -- was there a subsequent
8 meeting between you and other TVA personnel in January of '03?

9 A. I believe there was. I recall that.

10 Q. What do you recall about that meeting?

11 A. I believe, if I'm remembering -- I'm trying to remember
12 if John Ship was there. Or Larry Galtney, I believe, was
13 there from TVA.

14 Q. Is that all you remember about it?

15 A. Well, I remember there was some discussion where we were
16 asking for information from TVA regarding plans and schedules
17 so that we could try to factor that into our ambient air
18 analysis.

19 Q. Did you get the information you asked for?

20 A. My understanding is we did. And we did use what we could
21 of that.

22 Q. Now, you also testified about the various provisions of
23 the Smokestacks Act. I think one provision you didn't mention
24 was Section 11. Section 11 includes a reporting requirement,
25 doesn't it?

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1 A. I believe that's correct.

2 Q. And it requires a report on the feasibility of obtaining
3 reductions in NOx and sulfur dioxide beyond those required by
4 the Smokestacks Act.

5 A. That's correct.

6 Q. And I believe the statute had an original date by which
7 the report was to be made. Wasn't that date September 2005?

8 A. It was. And it was subsequently amended to 2007.

9 Q. Has that report been made?

10 A. We have made two reports under that provision to the
11 legislature to date.

12 Q. Both such reports recommended postponing a substantive
13 report, didn't they?

14 A. It -- there was a consideration of postponing; but
15 basically, what we said in the report was our sense is the
16 control required by the Clean Smokestacks does represent state
17 of the art at this point in time. The essence of the
18 provision was that we review the technology and technological
19 feasibility and economic feasibility of going beyond the Clean
20 Smokestacks provisions.

21 MS. COOPER: I'd like to move Exhibit 46 into
22 evidence, Your Honor. That's the May 30, 2003, Smokestacks
23 Act report.

24 MR. GULICK: Object to that, Your Honor, because
25 it's not a complete document.

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1 MS. COOPER: We can submit the complete document,
2 Your Honor, but we submit it specifically for the purpose of
3 talking about the one page in there that Mr. Nicholson has
4 agreed is correct.

5 THE COURT: The objection is overruled. Go ahead
6 with your question.

7 MS. COOPER: All right.

8 (Defendant's Exhibit Number 46 was received into
9 evidence.)

10 Q. Now, I'd like you to pull out what was previously
11 admitted as Plaintiff's Exhibit 10, which is the June 1, 2008,
12 Smokestacks Act report. And I'd like you to direct your
13 attention to Page 9.

14 A. That was Exhibit 10?

15 Q. Exhibit 10.

16 A. I believe you said Page 9?

17 Q. Page 9.

18 A. Okay.

19 Q. Look down there at what is the first paragraph on the
20 page. Not the continuation but the part that begins "Progress
21 Energy." Do you see that?

22 A. The one above the next paragraph heading?

23 Q. Yes.

24 A. The short paragraph.

25 Q. Yes.

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1 A. Yes.

2 Q. And according to this report, Progress reported that its
3 cost estimate for complying with Smokestacks was 90 percent
4 higher than the original 2002 cost estimate; isn't that
5 correct?

6 A. That's correct. And that was submitted in their report.

7 Q. And Duke made a similar cost estimate of 23 percent
8 higher than the original 2002 estimate; isn't that correct?

9 A. Correct.

10 Q. Now, is the Smokestacks Act out ahead of most states in
11 terms of a state standard?

12 A. I think certainly it might be viewed that way. I think a
13 lot of states have talked about doing multi-pollutant
14 regulations and strategies. The State of Maryland has also
15 adopted -- or enacted a similar program. Other states have
16 talked about it. We've talked to a number of states that have
17 been looking at development --

18 Q. Well, have you talked about it that way?

19 A. We have noted that we, perhaps, are out ahead of a number
20 of states as a point of encouraging others to come along,
21 quite frankly, and as the Clean Smokestacks -- or excuse me,
22 the SAMI analysis suggested that we need to be making these
23 reductions, yes.

24 Q. Well, Mr. Nicholson, I'd like you to take a look at Page
25 33 from your 30(b)(6) deposition. Do you have --

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1 A. I see it on the screen.

2 Q. All right. And you were asked a question about why DENR
3 didn't lower standards and you said, "I think just the
4 tradition of meeting the ambient standards in North Carolina,
5 as was the case in many states. I think one can clearly see
6 that our Clean Smokestacks Act was out ahead of most states in
7 terms of a state initiated effort."

8 So didn't you yourself use that language in describing
9 the Smokestacks Act?

10 A. I did and I still feel strongly that that's the case now.
11 We believe this is the right thing to do and even if it is up
12 against a given ambient air quality standard.

13 Q. Thank you, Mr. Nicholson.

14 Let's turn now to Plaintiff's Exhibit -- I'm going to go
15 backwards, Plaintiff's Exhibit 11. Let's make that
16 Plaintiff's Exhibit 13, which is the summary.

17 Now, I believe you previously identified the summary as a
18 summary of certain CAIR models; is that correct?

19 A. That's correct.

20 Q. And if you look at the heading on the page, it says,
21 "PM_{2.5} Contributions From All Manmade Sources in Listed
22 States."

23 A. Yes.

24 Q. So the CAIR models all sources of pollution in those
25 states, correct?

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- 1 A. These are what are called zero outruns.
- 2 Q. Isn't it true that there are many other pollution sources
- 3 in Alabama besides TVA?
- 4 A. I'm sure there are other sources besides TVA.
- 5 Q. And isn't the same thing true in Kentucky?
- 6 A. I would agree.
- 7 Q. And isn't even the same thing true in Tennessee?
- 8 A. I would say that's likely true; however, an awful lot of
- 9 the emissions, particularly in Tennessee, 72 percent of the
- 10 SO₂ emissions are from TVA.
- 11 Q. Well --
- 12 A. Of the state's total emissions.
- 13 Q. What's the date on that estimate, do you know?
- 14 A. I think 2002, if I'm recalling correctly. Or 2000 --
- 15 2002, I believe.
- 16 Q. Well, the SAMI numbers were as of March 2005; isn't that
- 17 right?
- 18 A. This is CAIR analysis.
- 19 Q. I'm sorry, CAIR numbers as of March 2005; isn't that
- 20 right?
- 21 So the percentage that you used may have changed by
- 22 March 2005?
- 23 A. Perhaps some.
- 24 Q. You don't know what it is for March 2005?
- 25 A. I cannot say exactly. I doubt, though --

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1 Q. In Alabama there are other power plants besides TVA;
2 isn't that right?

3 A. I'm sorry, I didn't understand.

4 Q. In Alabama there are power plants other than those
5 belonging to TVA; isn't that right?

6 A. That's my understanding, yes.

7 Q. And the same is true in Kentucky.

8 A. That's also my understanding.

9 Q. Now, CAIR didn't model TVA's emissions, did it?

10 A. It modeled the emissions in this particular analysis, the
11 statewide emissions, yes.

12 Q. No, I asked you whether it modeled TVA's emissions.

13 A. It did as an inherent part of modeling the state
14 emissions from Tennessee.

15 Q. But not separately.

16 A. I don't have knowledge of that.

17 Q. Thank you.

18 I'd like you to dig out Plaintiff's Exhibit 1 which is
19 the SAMI report.

20 Do you have that?

21 A. I do.

22 Q. All right. The first thing I'd like to do is ask you to
23 turn to Page 2.6.

24 (Witness complied.)

25 Q. Which is the SAMI 8-State Emissions Summary by Sector and

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- 1 Strategy.
- 2 A. I have it.
- 3 Q. You have it.
- 4 Do you see the line that's the second line in that says
- 5 "1990 A1, A2, B1, B2, B3?"
- 6 A. I do.
- 7 Q. Can you explain to us what those abbreviations mean.
- 8 A. Okay. Again, that's in the heading for the whole table.
- 9 And those are the designations for the particular strategy or
- 10 in the case of 1990, emissions base inventory which is
- 11 projected to 2010 without the strategy. That's what the
- 12 meaning is. In other words, the column below that reflects
- 13 the associated emissions of each pollutant as listed in the
- 14 table for each of the sectors listed in the table going down.
- 15 And going across, of course, is the range of strategies.
- 16 Q. Well, do you remember what the A -- let's say what the B1
- 17 strategy was?
- 18 A. Well, I don't remember in my head all of them, but they
- 19 do follow in a table just after this. They're all listed for
- 20 each source category.
- 21 Q. All right. Let's take a look at Page 2.8.
- 22 A. Okay.
- 23 Q. You said you don't really remember what the A1, A2, B1,
- 24 B2 --
- 25 A. Conceptually, absolutely; but specifically for each

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1 source category which strategy we applied, I need to refer to
2 the table.

3 Q. Well, conceptually what are they?

4 A. Well, conceptually the A1 strategy, I believe, as I
5 explained before, and the A2 are basic strategies.

6 A1 is a strategy of emissions that would occur in each of
7 the two future projection years if we applied only those
8 regulatory programs that are currently on the books. In other
9 words, enforceable on the books is A1.

10 We add to that in A2 to those programs that we expect,
11 fully expect with great certainty and SAMI participants agreed
12 in by consensus we should include in that. Of particular note
13 is the NOx SIP Call and the Tier II standards for the federal
14 tailpipe standards. Tier II is in A2.

15 Q. And what about B1?

16 A. B1, then, is additional emissions reduction strategies
17 applied to A2.

18 Q. How much additional reduction strategies?

19 A. Well, conceptually in B1, it's not that much more. B2 is
20 greater. B3 is even greater. B1 conceptually contains
21 consideration of costs and technological feasibility currently
22 existing. B2 goes beyond that, and B3 well beyond that in
23 that it's prototypes that might be existing now and less
24 consideration of cost and technical -- or economic feasibility
25 into the future, but one that we want to -- wanted in SAMI to

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- 1 understand if we could get to that point in 2010, 2040 --
- 2 Q. Is there a -- excuse me. Is there a common name that B1
- 3 is called?
- 4 A. Well, B1 strategy as we ended up here.
- 5 Q. Is there a common name that B2 is called?
- 6 A. I'm not sure what you mean by common name.
- 7 Q. A shorthand way to refer to it.
- 8 A. We decided on the B strategies in the final analysis.
- 9 Q. Have you -- are you familiar with the term B1 being
- 10 called "on the books?"
- 11 A. A1 is "on the books." A2 is "on the way." B strategies
- 12 are beyond the base strategies of "on the books" and "on the
- 13 way."
- 14 Q. But they had things of that -- names of that nature,
- 15 didn't they?
- 16 A. Sure.
- 17 Q. And what were they?
- 18 A. In the B strategies?
- 19 Q. Yes.
- 20 A. Actually, quite honestly, I don't recall what we did, but
- 21 we did have shorthands and we decided that they weren't --
- 22 they might bring connotations of some control and we wanted to
- 23 have a description that was -- that didn't carry that. So we
- 24 decided on just the label of B strategies.
- 25 Q. Now, when your counsel was questioning, you looked at a

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1 number of state-by-state maps in the SAMI report, and those
2 maps talked about Kentucky, for example. And when those maps
3 referred to Kentucky, they referred to all utility sources in
4 Kentucky not just TVA; isn't that correct?

5 A. They referred actually to SO₂ emissions in the state of
6 Kentucky.

7 Q. Whatever the source.

8 A. Okay. That's correct.

9 Q. And the same is true for Alabama.

10 A. And each of the states.

11 Q. And each of the states. And as far as you know, there
12 was no TVA specific modeling done with respect to SAMI; isn't
13 that right?

14 A. Well, let me -- let me clar --

15 Q. Let me -- let me make my question a little bit clearer.

16 A. Okay.

17 Q. That is, SAMI didn't identify that TVA's plants, coal-run
18 plant, for example, emitted X quantity of SO₂ which then
19 reached a certain location; isn't that correct?

20 A. We did in our broad general modeling in SAMI. We did
21 identify each emission point and we had the states and the
22 sources concur on a consensus basis that they were the right
23 emissions for the base year, projection years, to projection
24 years. In the sensitivities -- and I'm drawing a distinction
25 between the broad modeling of all sources across all of the

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1 full set of nine episodes that we modeled and the more
2 surgically specific sensitivity analysis per state.

3 So yes, we did factor in all of the utilities including
4 TVA and every other utility in the region in all eight states
5 and even --

6 Q. But you didn't separate out, that was my question.

7 A. Well, it separated out internally the model. The model
8 handles it as a source within the model and it counts those
9 emissions when the mathematical model considers meteorology --

10 Q. In the aggregate for the state, correct?

11 A. No, let me -- well, I missed my point -- making my point.
12 In the broad modeling SAMI did, we counted all emissions in
13 the full eight states and we ran the full suite of
14 meteorological episodes to get the results in the broad air
15 quality model.

16 In addition to the broad air quality modeling, we did
17 state-by-state, region-by-region sensitivity analysis that we
18 went through earlier to show what the effect would be of
19 controlling in a certain region, a certain state. By reducing
20 in a sensitivity context, say 10 percent, we showed the
21 qualitative relative benefit of doing that and where the
22 benefits would accrue. We did really both if that wasn't
23 clear.

24 So yes, we have very clearly accounted for emissions of
25 Progress, Duke, TVA, Alabama Power, every one of them in our

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- 1 broad analysis.
- 2 Q. I don't think you've answered my question yet. The
- 3 question --
- 4 A. I'll try again.
- 5 Q. -- is have they been accounted for?
- 6 A. Yes, they have been accounted for.
- 7 Q. The question -- that wasn't the question. The question
- 8 was were they broken out separately to see their effects?
- 9 A. In a sensitivity context not to my knowledge, no.
- 10 Q. All right. Now, let me ask you a little bit more about
- 11 that sensitivity analysis. You were talking about a
- 12 10 percent reduction.
- 13 A. Yes.
- 14 Q. What was it a reduction from and to?
- 15 A. It was a reduction from the A2 inventory that we just
- 16 talked about, that being the base inventory projected to a
- 17 future year applying both on-the-books and on-the-way
- 18 controls, and then we reduced that inventory for each state by
- 19 10 percent, the SO₂ inventory by 10 percent and then the NOx
- 20 inventory by 10 percent.
- 21 Q. Do you remember the actual numbers? How many emissions
- 22 were projected for SO₂ for the state of Tennessee and how much
- 23 was the reduction?
- 24 A. No, I don't remember precisely what that number is.
- 25 Q. Isn't it true that SAMI used a 1990 base?

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1 A. It is true.

2 Q. So that the emissions you were looking to reduce from
3 were 18 years ago.

4 A. No. We projected -- we used that as a base inventory.
5 The concept of modeling is we have to form a base of
6 knowledge, that we have a complete inventory and then we take
7 that base and we grow it into future years --

8 Q. Well, let me ask you another question about that.

9 MR. GULICK: Your Honor, ask that the witness be
10 allowed to answer -- finish his answer.

11 THE COURT: Yes, let the witness finish his answer
12 before you interrupt the question -- before you interrupt it.
13 Go ahead and finish your answer.

14 THE WITNESS: Yes, it is true that we used a 1990
15 base, and realize this analysis was done in the mid '90s. We
16 took that base and it was a known base and it was one that
17 everyone could agree historically go back and double check
18 what was actually emitted, so forth and so on. And then the
19 technique in modeling is you take those broken out, factored
20 out by sources and source types and then you apply growth
21 factors.

22 Q. Okay.

23 A. And we, in fact, for the year 2010 and 2040 had those
24 emissions changes and growths confirmed by each of the
25 utilities, each of the states and all the industrial sectors

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1 that were involved in the model, so --

2 Q. All right. Let me ask you another question about that.
3 Isn't there a more current and accurate emissions inventory
4 than the one that's been used?

5 A. I'm sure there is. One could be constructed, yes.

6 Q. Hasn't one been constructed?

7 A. I think for various purposes they have been. And over
8 time with these kinds of air quality modeling analyses you do,
9 you update your inventory.

10 Q. Is VISTAS one of those? VISTAS.

11 A. VISTAS, yes. I'm sorry.

12 Q. All right. And didn't SAMI also use 1990 cost figures?

13 A. I think these cost figures were updated and the cost, if
14 you remember -- in fact, I think some of them were to 2000
15 costs if I'm remembering correctly. But they are adjusted
16 through analysis by people that are familiar with what
17 equipment costs are and dollars are adjusted to different
18 years.

19 Q. They were from a 1990 baseline, correct?

20 A. That's the original inventory baseline, correct.

21 Q. Now, isn't it true that there have been more accurate and
22 up-to-date models that are able to be used than the ones that
23 SAMI used?

24 A. Well, models have evolved over time. Certainly we think
25 a lot of care was put into the SAMI modeling and it was

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1 carefully done. As I said, it was done with an input of a lot
2 of people. Certainly, one would reason -- I think others may
3 talk to this -- that we'll see more modern models, if you
4 will. But I think clearly one of the things that SAMI did was
5 that one atmosphere model for the first time that we're aware
6 of be able to understand what all of these welfare related --

7 Q. All right. The question really had to go with to whether
8 there was a more modern --

9 A. Well, I'm just explaining that we did in fact innovate in
10 SAMI at that time and there have been models since, certainly.

11 Q. Now, SAMI didn't include any analysis of health benefits,
12 did it?

13 A. Not directly, that's correct.

14 Q. And the reason for that was that they were too uncertain;
15 is that not correct?

16 A. No, the reason for that was that the purpose of SAMI was
17 to look at air-quality related values in the Southern
18 Appalachians which was visibility, damage or injury or effects
19 on streams, the terrestrial effects, and forests. That was
20 the explicit purpose of SAMI.

21 Q. Well, let me direct your attention to Page 8.1. And near
22 the bottom of the middle paragraph, "Two topics - mortality
23 risk and competitiveness - were not taken to completion. The
24 contractors fulfilled their obligations, but it was felt that
25 the draft reports on those topics were not comprehensive

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1 enough to form conclusions given the uncertainty." Isn't
2 that what SAMI reported?

3 A. That's correct. Let me add that, you know, the purpose
4 of SAMI was to look at these welfare related issues, not
5 health. And while we may have had a contractor start to look
6 at it, we realized that wasn't the focus of SAMI. So that was
7 part of the decision to not continue that.

8 Q. SAMI itself said it was because of the uncertainties, not
9 because it wasn't consistent with the purpose, right?

10 A. That's what got written in the report.

11 Q. That's what the report says, that's correct.

12 A. Yes.

13 Q. Now, SAMI recognized that there were substantial
14 uncertainties throughout estimating emissions and projecting
15 their impact, didn't it?

16 A. SAMI did recognize uncertainties and that varied by the
17 nature of the source and the nature of the pollutant. In
18 fact, there are even tables in here that suggest relative
19 degrees of uncertainty depending on the pollutant and the
20 source, yes.

21 Q. And the uncertainties had to do with everything from the
22 emissions inventory to the assumptions made in the computer
23 modeling and with the performance of the model itself, didn't
24 they?

25 A. Well, let me -- let me again emphasize that the degree of

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1 certainty from power plants and other major stationary sources
2 was of the highest certainty and the least certain on ammonia
3 and some of the more area sources or agricultural sources. So
4 it varied. And yes, there are uncertainties inherent in all
5 simulation models.

6 Q. And there were also uncertainties with respect to the
7 assessment of impacts on various kinds of resources, such as
8 aquatic and forest resources; isn't that right?

9 A. That is correct. All simulation models have inherent
10 uncertainties.

11 Q. And there were uncertainties about projecting the
12 response of fish and forest to changes in acid deposition;
13 isn't that right?

14 A. I'm not qualified to answer specifics on that, effects
15 modeling that we did, but certainly --

16 Q. Well, didn't SAMI say that?

17 A. I'd probably have to reread it. But I -- again, I think
18 all simulation modeling has a certain degree of uncertainty of
19 varying nature.

20 Q. Now, on your direct examination you testified about the
21 valuation of recreational visibility.

22 A. Yes.

23 Q. And isn't it true that SAMI concluded that the estimates
24 that you were talking about are uncertain and controversial?

25 A. I think I would want to see those words in the context

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1 that you're suggesting.

2 Q. All right. Well, let me direct your attention --

3 A. Okay.

4 Q. -- to Page 8.7, the first paragraph.

5 And the first line says, quote, "The estimates of
6 recreational and residential visibility valuation are
7 uncertain and controversial." Isn't that what SAMI said about
8 those values that you testified about this morning?

9 A. It does. And I would say that we understood that and the
10 values that we're quoting do give ranges and that we
11 understand that uncertainty. Doesn't mean that the values are
12 necessarily wrong. It may not be precisely or absolutely
13 correct, but it certainly gives us an indication of the range.

14 THE COURT REPORTER: I didn't get your question at
15 all with the answer going on. Could you repeat your question.

16 THE COURT: Let's get out of the habit of breaking
17 in the answer.

18 MS. COOPER: Sorry, Your Honor.

19 THE COURT: Let the witness finish.

20 THE WITNESS: What I was saying is that while -- and
21 it's true, we do recognize uncertainties here; but again, in
22 this type of analysis, part of the effort is to get a feel for
23 and a ballpark of the range of values in this particular
24 socioeconomic analysis. Doesn't necessarily mean it's wrong,
25 but certainly the uncertainties with it. And as in any

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1 analysis, there will be a range of values that one might
2 associate with a more certain end of the range or a less
3 certain end of the range.

4 Q. Okay. Isn't it true that SAMI also concluded that under
5 the entire range of its control strategies from what was on
6 the books to a very aggressive strategy, that the changes to
7 forests would likely be small?

8 A. I think, as I recall, in a very general way that there
9 will not be an overall significant shift in the forest area --
10 and other experts will talk about this -- basal area, but
11 there will be some competitiveness issues among species of
12 forests across the region.

13 Q. Well, let me ask you to take a look at Page 5.16, Key
14 Finding Number 6.

15 A. I'm sorry, was that 16, 5.16?

16 Q. 5.16.

17 A. Okay.

18 Q. In response to "Ozone Changes Under SAMI Strategies,
19 Changes in total basal area in the forest and the SAMI region
20 are likely to be small." Isn't that what the report said?

21 A. I'm not seeing the exact sentence, but that's --

22 Q. That's the first sentence of Key Finding Number 6.

23 A. Number 6, okay.

24 Q. It goes on to say, "Tree mortality in direct response to
25 ozone is not expected." Is that correct?

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BROCK NICHOLSON - REDIRECT

1 A. That is correct.

2 MS. COOPER: Your Honor, I have no further questions
3 of this witness.

4 THE COURT: Any redirect?

5 MR. GULICK: Yes, Your Honor.

6 THE COURT: All right.

7 REDIRECT EXAMINATION

8 BY MR. GULICK:

9 Q. Starting from the back, Mr. Nicholson. You'd indicated
10 before that SAMI was a consensus product.

11 A. That's correct.

12 Q. Is that right?

13 Did SAMI decide that the residential -- that the
14 valuations of visibility were worthy of publication in the
15 final report?

16 A. It did, even recognizing the uncertainties.

17 Q. With respect to the -- I've lost the page number, but
18 there was a -- you were asked about, I think at Page 8.1,
19 about the health reports. If you would go back to that,
20 please.

21 A. Okay.

22 Q. Did you find that location?

23 A. I did. I have it.

24 Q. So this is in the left-hand column.

25 A. Yes.

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BROCK NICHOLSON - REDIRECT

1 Q. And didn't it indicate that the -- doesn't it indicate
2 that it was felt that the reports on these topics were not
3 comprehensive enough?

4 A. (No response.)

5 Q. Have you found where it is?

6 A. I'm looking, reading now.

7 Q. It's in the lower half of the left-hand column of 8.1,
8 the same place that counsel for TVA directed your attention
9 to.

10 A. Starting in "Two Topics?"

11 Q. Yes.

12 A. Well, I'll just -- okay. I'll read it.

13 Well, it simply says -- and I think I do recall this
14 discussion. "Two topics - mortality risk and competitiveness
15 - were not taken to completion as opposed to the other six
16 areas that were looked at. The contractors fulfilled their
17 obligation, but it was felt that the draft reports on these
18 topics were not comprehensive enough to form conclusions given
19 the uncertainties. Therefore, these two topics did not result
20 in finished reports."

21 Q. So is it correct that there was a determination that the
22 reports were not comprehensive enough --

23 A. I think that was the determination.

24 Q. -- to draw conclusions.

25 A. Pardon?

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1 Q. Isn't the conclusion that the reports were not
2 comprehensive enough to draw conclusions?

3 A. That is correct. And that was two of the six areas, I
4 should clarify that point, not six others.

5 Q. With respect to Blue Ridge Paper which was mentioned to
6 you by counsel for TVA, is Blue Ridge Paper a utility?

7 A. No, they are not.

8 Q. How -- what sector, with respect to SAMI's
9 characterizations, in what sector would you put Blue Ridge
10 Paper?

11 A. That would be an industrial or nonutility. Point source
12 type source.

13 Q. And do you know whether or not the State of North
14 Carolina has value -- has done an evaluation of Blue Ridge
15 Paper?

16 A. We actually have done a fairly extensive evaluation of
17 Blue Ridge Paper as part of their Regional Haze Program where
18 we are required to both look at what's called Best Available
19 Retrofit Technology, BART, under that haze rule for those
20 sources that were built in a 15-year period prior to the '77
21 amendments, and we in fact did that. And also, in addition to
22 that, we were to evaluate other remaining nonBART, as we call
23 them, sources to see if they should be controlled under
24 provisions of the regional haze and that's called Regional
25 Progress Analysis. We did in fact do that as a

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1 comprehensive -- part of a comprehensive effort where we
2 looked at all the sources within certain distances in all the
3 Class I areas and we did in fact conclude at this time that
4 it's very cost prohibitive to require further controls on that
5 source.

6 And if we're talking -- I'll just use the reference
7 earlier, the 8,000 tons versus many more thousands of tons at
8 the utilities, the decision was that given the cost, cost
9 being maybe upwards of ten or more times up to 14,000 or in
10 one case maybe a hundred thousand dollars per ton reduce
11 versus the 13ish or so to \$1,900 a ton for a utility, that we
12 would not require that as part of our Regional Haze Program.

13 However, we have put them on notice. We sent a letter to
14 Blue Ridge Paper as well as others saying that in the next
15 round of analysis for regional haze, they are on notice that
16 they will be evaluated for further control. But in the realm
17 of priorities and issue for getting emissions reductions, they
18 are in the next round. They're in the queue for the next
19 analysis, if you will.

20 Q. With respect to the National Ambient Air Quality
21 Standard, also known as NAAQS, N-A-A-Q-S, did the State of
22 North Carolina have occasion to comment to EPA on the fine
23 particulate or PM_{2.5} NAAQS?

24 A. We did.

25 Q. The last time that it was considered?

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1 A. We did.

2 Q. I'd like to show you what is Plaintiff's Exhibit 14. You
3 don't need to look for it.

4 MR. GULICK: Bear with us, Your Honor. We had to
5 make an adjustment to the electronic equipment.

6 THE COURT: Plaintiff's 14?

7 BY MR. GULICK:

8 Q. Mr. Nicholson, do you know what this letter is?

9 A. Yes, I do.

10 Q. And what is it?

11 A. It is our comments made to the docket, USEPA docket
12 relative to the promulgation of a standard, NAAQS standard for
13 particulate matter.

14 Q. And do you know what the comment of the Division of Air
15 Quality was?

16 A. I think the key comment that the Division of Air Quality
17 made was that given our concern about there being no level
18 below which we aren't protective of -- well, are protective,
19 if you would, of adverse health effects, we recommended that
20 the administrator consider the Clean Air Science Advisory
21 Group when setting the standard for particulate.

22 Q. Do you know what the advice of the Clean Air Science
23 Advisory Group was?

24 A. In a general notion, yes.

25 Q. And what was that?

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1 A. That was that -- I don't know if I see it referenced on
2 here. That they set it considerably lower than what the
3 administrator ended up choosing.

4 Q. Are you aware whether the administrator had ever rejected
5 the advice of his science advisors before?

6 A. We believe that that was probably the case in the ozone
7 standard -- well, subsequent to that, the ozone standard, but
8 not prior to this date.

9 Q. So the ozone standard was a later situation?

10 A. It was a later standard, yes.

11 Q. So is this the first time that you're aware of --

12 A. That's my understanding, that it is the first time.

13 Q. I would like to draw to your attention to Plaintiff's
14 Exhibit 15.

15 Are you familiar with this document?

16 A. I am.

17 Q. And what is this document?

18 A. This is a letter to the administrator of the USEPA from
19 our attorney general.

20 Q. And what is the subject of this?

21 A. The subject is Comments on the Proposed Rule to Set a
22 National Standard for Particulate Matter.

23 Q. And do you recall what the recommendation of this letter
24 was?

25 A. As I recall, that essentially the same recommendation,

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1 that the administrator should follow the Science Advisory
2 Board in setting that standard or consider the recommendations
3 of the Clean Air Scientific Advisory Committee. CASAC for
4 short.

5 Q. And again, was the advice of the Scientific Advisory
6 Committee to lower the NAAQS for PM_{2.5}?

7 A. Lower than the administrator proposed or ended up
8 setting.

9 Q. In fact, the administrator did not change that standard
10 for an annual standard.

11 A. That's correct.

12 MR. GULICK: Your Honor, I would move the admission
13 of these two letters into evidence.

14 THE COURT: That's 15 and what's the other?

15 MR. GULICK: 14, Your Honor.

16 THE COURT: All right.

17 (Plaintiff's Exhibits Numbers 14 and 15 were
18 received into evidence.)

19 MR. GULICK: Your Honor, we had some question in our
20 mind as to whether we had moved the admission of our Exhibit
21 Number 5A, which was the chart, into evidence. I may have
22 missed it.

23 THE COURT: You have not admitted -- or requested
24 that 5A be admitted.

25 MR. GULICK: I would move that it be admitted. That

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1 was an oversight, Your Honor.

2 THE COURT: Let that be admitted.

3 (Plaintiff's Exhibit Number 5A was received into
4 evidence.)

5 THE COURT: All right. Does that complete your
6 redirect?

7 (Co-counsel conferred.)

8 MS. COOPER: Nothing further, Your Honor.

9 THE COURT: Any further recross?

10 MS. COOPER: No, Your Honor.

11 THE COURT: All right. The witness may be excused.

12 THE WITNESS: Thank you, sir.

13 THE COURT: Thank you.

14 (Witness stepped down.)

15 THE COURT: Call your next witness.

16 MR. GULICK: Your Honor, we would call Mr. Bill
17 Jackson.

18 WILLIAM A. JACKSON,

19 being first duly sworn, was examined and testified as follows:

20 DIRECT EXAMINATION

21 BY MR. GULICK:

22 Q. Would you state your full name.

23 A. William A. Jackson.

24 Q. Where do you live, Mr. Jackson?

25 A. I live here in Asheville, North Carolina.

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1 Q. Where did you receive your higher education?

2 A. I received a Bachelor of Science in Biology from Albion
3 College. It's in southern Michigan. And I received a
4 Bachelor of Science in Forestry from the University of
5 Michigan.

6 Q. And where are you currently employed?

7 A. I'm employed with the U.S. Department of Agriculture.
8 The agency is called the Forest Service.

9 Q. And what is your position with the United States Forest
10 Service?

11 A. I'm currently an air resource specialist.

12 Q. How long have you held the position of air resource
13 specialist?

14 A. I've had this position since 1992. Or 1991 -- 1992,
15 uh-huh.

16 Q. When did you first start working for the U.S. Forest
17 Service?

18 A. I began when graduating from the University of Michigan
19 back in 1982 taking summer appointments with them, and it was
20 about three years of what we call temporary work before I
21 became permanent full-time.

22 Q. And with the U.S. Forest Service, could you tell us
23 what -- what the course of your employment has been in terms
24 of the jobs that you did, the work that you did.

25 A. Sure. The first part of my career really was working at

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1 insect and disease problems, forest and lands. That could be
2 national forests as well as other governmental ownerships, for
3 example, national parks and Corps of Engineering sites, for
4 example. In that work in my early career, I worked on surveys
5 to detect and quantify the presence of insects and diseases.

6 Now, in the middle of that also I did do basic research,
7 working for Forest Service research looking at biotechnology
8 techniques to look for disease resistance in forest trees, as
9 well as some other work with the University of Minnesota.

10 When I became permanent full-time, I was still what was
11 classified as a forestry technician, and there I had greater
12 responsibilities in terms of working with the other summer
13 crew members and carrying out the surveys that were designed
14 by the professionals as well as also had the responsibility of
15 conducting aerial surveys of federal lands, looking in
16 particular for insect defoliations.

17 Then I should go on to say after I became permanent
18 full-time, I received a job as a plant pathologist with the
19 Forest Service in Morgantown, West Virginia, and there I
20 worked in seven states helping state and federal clients
21 looking at their insects and disease problems that they had.
22 This would range from introduced insects and diseases as well
23 as native pests also.

24 But it was also during that same time period that I began
25 my work in air quality because air pollution is considered a

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1 tree disease. And there I began working at ground-level ozone
2 impacts to forest trees as well as looking at nutrient
3 deficiencies in the red spruce forest at the high elevations
4 in West Virginia.

5 Q. And since you have become -- was it after that that you
6 became an air resource specialist?

7 A. It is. When I left Morgantown, West Virginia, it was to
8 move here to Asheville to work solely on air pollution
9 problems.

10 Q. Since 1992 you've worked as an air resource specialist
11 for the U.S. Forest Service?

12 A. That is correct.

13 Q. Describe what your responsibilities are as air resource
14 specialist.

15 A. Well, there is really a range of responsibilities, but
16 one of the primary responsibilities I have is to advise -- and
17 this is a designation in the Clean Air Act Amendments of
18 1977 -- the federal land manager, in this case it's the forest
19 supervisor who resides here in Asheville, on whether a new
20 source of air pollution will cause adverse impacts to any
21 air-quality related values at a federally designated Class I
22 area.

23 So when permits come in, for example, let's say there's a
24 new coal-fired power plant or a facility wants to expand
25 production, I'm the technical contact for both the applicant,

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1 for the company, usually their consultants, as well as the
2 state air regulatory agency, and they provide me documentation
3 that I will review, provide a technical review on behalf of
4 the federal land manager and then provide recommendations to
5 the federal land managers so that they can make the final
6 decision on whether a new source of pollution has an adverse
7 impact or not.

8 Well, in order to make decisions, you need to have data.
9 And so I'm also responsible for conducting the inventory and
10 monitoring of the air-quality related values at these
11 federal -- at these federally mandated Class I areas.

12 And if I could pause a moment and say for the Forest
13 Service not only are we concerned about these Class I areas,
14 we care about the whole national forest. So our surveys also
15 extend beyond just these three wildernesses that have Class I
16 designation in western North Carolina.

17 And also I work in eastern Tennessee. I have worked in
18 eastern Tennessee and in the upstate of South Carolina, but my
19 role has been beyond that.

20 But in particular, we have installed fine particle
21 monitoring under the improved protocol that looks at what
22 kinds of fine particles are in the atmosphere, and that's very
23 relevant in terms of our role of visibility protection in the
24 Class I areas.

25 Q. And just so we can, you did mention the air-quality

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1 related values.

2 A. Yeah.

3 Q. What are the air-quality related values that are of
4 concern to the U.S. Forest Service?

5 A. We have taken a broad stance on that in terms of how we
6 classify them. But we talk about in terms of flora, fauna, as
7 well as visibility. And visibility in particular because the
8 Clean Air Act Amendments of 1977 specifically direct the
9 federal land manager to protect visibility. And so those are
10 some of the air-quality related values that we're trying to
11 look at.

12 Now, when we look at, for example, systems, we measure --
13 we will look at water. We are looking at ambient
14 concentrations of ozone. Those are our indicators to try and
15 give us an understanding of what's going on with the
16 air-quality related values.

17 Q. I would like to draw to your attention, Mr. Jackson, to
18 Exhibit Number 440, Plaintiff's Exhibit 440.

19 A. Uh-huh.

20 Q. It should be on the screen in front of you.

21 A. Yes.

22 Q. And can you tell the court what this document is.

23 A. This is my curriculum vitae talking about my educational
24 background as well as my special accomplishments that I've had
25 during my work career, and it would go on to say the specific

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1 locations where I work and the major tasks that I performed.

2 Q. I take it this includes the past history -- your past
3 history of employment that you've been describing to us
4 earlier.

5 A. That is correct, yes.

6 Q. I notice on Page 16 of this document, there is a
7 reference to a Southern Appalachian Assessment.

8 A. Yes.

9 Q. It says you were a team leader.

10 A. Can you tell us -- Southern Appalachian Assessment, the
11 first paragraph, can you tell us what was going on with this
12 particular study.

13 A. Uh-huh. Well, this was in particular a study by the
14 federal agencies. The Forest Service was certainly a leader
15 in this. And it fell under the auspices of the Southern
16 Appalachian Man and the Biosphere. SAMAB was the acronym.
17 And the Forest Service definitely was the leader in getting
18 this going under the SAMAB program of trying to take a
19 comprehensive ecological look at the whole Southern
20 Appalachians, but they had other partners, including EPA
21 Region 4, Tennessee Valley Authority, as well as other federal
22 agencies in the region that are part of the SAMAB program.

23 Q. And what was the goal -- what did the Southern
24 Appalachian Assessment do?

25 A. In a nutshell, it's really trying to compile the

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1 available information at that particular time that we could
2 obtain just to describe what is the current conditions in the
3 Southern Appalachians. And air quality was one of those focus
4 areas that was actually requested by the public.

5 Q. And what aspects of air quality did it evaluate?

6 A. We looked at what the emissions were up to that --
7 something about the emissions that we could gather at that
8 time. We looked at the effects of acidic deposition to
9 terrestrial and aquatic systems. We also looked at
10 particulate matter, and at that time we talked about PM10 and
11 how do we stand in relationship to the PM10 standard, as well
12 as ground-level ozone potential impacts to the forest as well
13 as in relationship to any issues regarding the National
14 Ambient Air Quality Standards.

15 I believe that those were the main areas.

16 Q. Were there any conclusions that the Southern Appalachian
17 Assessment reached?

18 A. It's been a while and I don't recall any at this time in
19 the sense of as we've heard about with SAMI. Nothing to the
20 extent and conclusions like that.

21 Q. Then let's turn to SAMI. I see that you've indicated
22 you're involved with the Southern Appalachian Mountains
23 Initiative which is mentioned at the bottom of Page 1 and on
24 to Page 2.

25 A. Uh-huh.

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1 Q. Were you involved with SAMI?

2 A. Yes, I was.

3 Q. And during what period of time were you involved with
4 SAMI?

5 A. Well, I like to kid around with people a little bit. I
6 was involved with SAMI before there was a name called SAMI.
7 And so I was there from the very early meetings in terms of
8 the formation of a group of federal land managers wanting to
9 work with the states in terms of air quality issues that were
10 occurring.

11 But I was with SAMI once it did form. I was on the
12 technical oversight committee and worked on helping develop
13 that was mentioned earlier, the Integrated Assessment in terms
14 of being able to pass emissions results into atmospheric
15 modeling, and then results from the atmospheric modeling were
16 then used in the effects models that we used. And that was
17 quite unique that was done at that time.

18 So once that was set up and we had the contractors in
19 place, then -- and I can't remember how many years we're into
20 the process, perhaps five or six years that I did a lot of
21 work with the Technical Oversight Committee. But during that
22 same period, all the way to the end, I worked quite a bit with
23 the Effects Subcommittee of SAMI.

24 Q. And those effects were what subjects?

25 A. They were for visibility, acidic deposition impacts to

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1 forests as well as water or aquatic systems, and ground-level
2 ozone impacts to vegetation.

3 Q. Let's go back to the beginning of SAMI, and could you
4 give us your perspective of what the issues were that led to
5 the formation of SAMI.

6 A. Sure.

7 MR. FINE: Your Honor, I'll object. I don't know
8 that this witness is competent to testify as to the
9 motivations of the formation of SAMI. He can talk to his own
10 motivations and his participation, but not as to why all these
11 states gathered their resources with all these other
12 organizations to put SAMI together.

13 MR. GULICK: Your Honor, I asked about the issues,
14 not the motivation --

15 THE COURT: Having addressed that question, you're
16 overruled at this point. Go ahead.

17 THE WITNESS: At that time there was a strong sense
18 of frustration --

19 MR. FINE: Your Honor, I'll restate my objection if
20 he's going to talk about a sense of frustration.

21 THE COURT: I've ruled on it so let's let the
22 witness answer.

23 MR. FINE: Very well, Your Honor.

24 THE WITNESS: That during the new source review
25 process, that we -- new sources of air pollution were being

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1 permitted at that particular time. And yet, we had adverse
2 impacts already occurring to the air-quality related values.

3 For example, we knew that there was adverse impacts
4 occurring to visibility. And the struggle that we were having
5 was how can we bring new sources on, how can we not make
6 adverse impacts determinations for every new source that comes
7 along when we know that the primary impacts that we're having
8 is really from older sources that are already permitted and in
9 operation.

10 And so the question really becomes is was there a
11 grounds, was there a way that beyond the recently implemented
12 Clean Air Act Amendments of 1990, because we felt that there
13 may -- there would need to be additional reductions of
14 pollutants beyond those levels to start remedying the adverse
15 impacts that were occurring, was there reasonable measures,
16 reasonable things that a state could do to reduce pollution so
17 that adverse impacts to the air-quality related values would
18 begin to subside or go away is really what we want.

19 Q. At that time -- I take it this was in the early 1990s.

20 A. Uh-huh.

21 Q. Were there adverse effects occurring with respect to
22 other air-quality related values in visibility?

23 A. We suspected that there was based upon the National
24 Atmospheric Precipitation Assessment Program, their results,
25 that's the NAPAP report, that talked about potential impacts

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1 of sulfur deposition in particular to aquatic systems.

2 We had measurements, for example, in Virginia that showed
3 that base 10 ion depletion was occurring in that area, so that
4 was of concern to us.

5 And also, there was high concentrations of ground-level
6 ozone that were reported in scientific literature that were
7 occurring at Mt. Mitchell.

8 Q. Thank you. Now I'd like to step away for a while from
9 SAMI and ask for you to talk to us about visibility, what it
10 is and what the issues are with respect to visibility.

11 MR. FINE: Your Honor, at this point I need to
12 interpose an objection.

13 Mr. Jackson is obviously going to be asked about
14 matters that will require him to render an expert opinion.
15 Mr. Jackson is not one of the experts who's favored us with a
16 report in this matter. And I believe that on that basis as an
17 expert --

18 THE COURT: Did you receive a copy of his vitae?

19 MR. FINE: We did, Your Honor.

20 MR. GULICK: Your Honor --

21 THE COURT: Does that not speak to his
22 qualifications?

23 MR. FINE: It does speak to his qualifications, Your
24 Honor, but we've not had a disclosure of the basis of his
25 expert testimony or any information as to the sum and

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1 substance of the opinions that he'll be rendering in his
2 testimony to the court today.

3 MR. GULICK: Your Honor, Mr. Jackson has been on our
4 witness list and the general subject about which he would
5 testify from the very beginning in the 19 -- excuse me, in
6 2006.

7 He is not specially retained by the state. He has
8 done no work for the state. All of the knowledge that he has
9 he acquired in the performance of his work as an employee of
10 the U.S. Forest Service. No doubt he has acquired special
11 knowledge and I believe that we could qualify him as an expert
12 witness.

13 However, all of the knowledge that he has -- and if
14 I must, I would -- I will go to that point. He was not -- we
15 disclosed the nature of the substance that he would be able to
16 talk about to give them plenty of opportunity to take his
17 deposition. As I say, he did no -- he was not retained by us
18 and did no special report for us and did no inquiry for us.
19 So all of his knowledge relates to what he learned and has
20 learned and done in the course of his employment with the U.S.
21 Forest Service.

22 And it's the case law of this circuit, Your Honor,
23 and I'm referring to *MCI Telecommunications Corp. versus*
24 *Wanzer*, and others, that the modern trend favors admission of
25 opinion testimony provided that it is well-founded on personal

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1 knowledge and is distinguished from hypothetical facts and
2 susceptible to cross examination. Certainly --

3 THE COURT: He appears to have adequate experience
4 to qualify him to proceed with the testimony that I've heard
5 so far, and I will let you proceed with your questioning given
6 that objection.

7 MR. FINE: I'm sorry, Your Honor, I didn't quite
8 catch the last...

9 THE COURT: The last was that you have the benefit
10 of an objection.

11 MR. FINE: Thank you, Your Honor.

12 THE COURT: Yes, sir.

13 And by the way, when you address the court, I expect
14 attorneys to stand.

15 MR. FINE: I beg your pardon, Your Honor.

16 THE COURT: Yes, sir, that's fine. Now that we
17 understand each other, let's proceed.

18 MR. GULICK: Bear with me a moment, Your Honor.
19 I've forgotten where I was.

20 Could you repeat back to me my last question.

21 THE COURT REPORTER: Now I'd like to step away for a
22 while from SAMI and ask for you to talk to us about
23 visibility, what it is and what the issues are with respect to
24 visibility.

25 MR. GULICK: Yes. Thank you.

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1 THE WITNESS: Let me start with in terms of
2 visibility.

3 In surveys that were conducted by the Forest Service
4 research asking the public, you know, why do you want to visit
5 the national forest, and consistently over the years when
6 they've asked that question, the people that they've polled
7 have come back and said one of the reasons that they visit
8 national forests is for the views, for the scenery. And
9 visibility, of course, is a very important part of that.

10 And as part of our role in terms of our federal land
11 management responsibilities and cooperating with EPA and
12 others, we monitor fine particles that are in the atmosphere.

13 For example, one of our monitoring sites is just off
14 the Blue Ridge Parkway near the Pisgah Inn. That's called the
15 Frying Pan Monitoring Site and it's there to try and
16 represent -- to monitor the fine particles that could be
17 impacting Shining Rock Wilderness. And what we have learned
18 from that particular data set is that the primary fine
19 particles that we measure in the atmosphere are sulfates and
20 those sulfates we know, based upon research that's been done,
21 based upon the studies, for example, like SAMI, they
22 originated as sulfur dioxide emissions. And if we look at
23 what source categories are major contributors to sulfur
24 dioxide emissions, it's primarily the coal-fired utilities
25 that are emitting sulfur dioxide.

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1 So that sulfur dioxide that's emitted into the
2 atmosphere goes through a chemical transformation. And part
3 of that transformation involves having oxidant present in the
4 atmosphere. Now, the primary oxidant in the atmosphere is
5 ozone and so ozone does have a role in terms of forming
6 aerosol particles in the atmosphere.

7 The sulfates then are transported downwind as
8 they're going through this chemical transformation, and what
9 they are -- what they do is they can scatter light. And
10 they're very efficient at scattering light because not only
11 does the sulfate particles by itself scatter light, but it's
12 also considered to be hygroscopic. That is, in humid
13 atmosphere like we have here in the southeast during the
14 summer months, those sulfate particles -- let me back up one
15 moment to say as they're traveling through the atmosphere,
16 those sulfate particles are sticky and they can stick to one
17 another and they can scatter light. But in a humid
18 atmosphere, they grow in size and they're very efficient at
19 scattering light. And so we usually put more weight -- well,
20 we don't usually. We put more weight on sulfate particles
21 that are present in the atmosphere because they are much more
22 efficient at scattering light at high relative humidities.

23 And so what we see in -- through our studies that
24 we've done before we did the fine particle measurements, we
25 actually had a camera located near Richland Balsam on the Blue

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1 Ridge Parkway for Shining Rock. We had other camera sites for
2 Joyce Kilmer and a separate site for Linville Gorge. And we
3 took those pictures three times a day for four years. And
4 what we learned from that is the primary visibility impairment
5 that we have is a uniform haze. Combining that information
6 with what we know from the fine particle monitoring, we
7 believe -- we know that the majority of that uniform haze, and
8 it agrees with the scientific information that we have, that
9 uniform haze is being caused by sulfate particles.

10 Now --

11 Q. Go ahead.

12 A. Yeah, thank you.

13 And we also are measuring other fine particles at these
14 particular sites and the second most important fine particles
15 is classified as organics or volatile organic compounds.
16 You'll hear them referred to as VOC is their acronym. And
17 those compounds are primarily emitted from vegetation. There
18 are sources, manmade sources of VOCs. For example, when we're
19 pumping gas into our vehicles and you smell some fumes, that's
20 VOCs, or when you're painting your house. But by and large,
21 the primary VOCs that are released, especially here in the
22 Southern Appalachians, is from vegetation. And if organics
23 were dominating visibility, we believe that we would have a
24 bluish cast to the mountains. Hence, we have the name the
25 Blue Ridge Mountains. But instead, what we see now on the

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1 poorest visibility days, those days that have fine particle
2 mass is you have what I describe as a white veil that occurs
3 and obscures our views, and that's an indication that you have
4 scattering of light that's occurring. And as I mentioned
5 previously, that's due primarily to sulfate compounds in the
6 atmosphere.

7 Q. Now, going back to SAMI for a moment.

8 A. Uh-huh.

9 Q. You were involved in the visibility study -- I think
10 you've already testified, the study that SAMI did, that
11 effects modeling.

12 A. Yes, I was involved with the Effects Subcommittee,
13 uh-huh.

14 Q. I'd like to draw your attention to Exhibit 1, Page 4.9.
15 I'm sorry, Page 71. I'm sorry, I got that wrong. Page 71,
16 Figure 4.9.

17 MR. FINE: I'm sorry, what's the reference, counsel?

18 MR. GULICK: I'm sorry, it's Exhibit 1, Page 71.

19 And Your Honor, it is on Page 4.1 of the physical
20 copy of Plaintiff's Exhibit 1.

21 THE COURT: All right. Go ahead.

22 Q. Mr. Jackson, are you familiar with this figure?

23 A. Yes, I am familiar with this figure, yes.

24 Q. Could you explain what it shows. You may have already
25 explained what it shows, but could you explain what this

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1 figure shows.

2 A. Okay. Well, this will take a couple moments to explain
3 it.

4 But first off, we have two graphics here. One is for the
5 Great Smoky Mountains National Park in terms of results and
6 the other one is for Shenandoah National Park. Now, what we
7 did here is we're just showing an example of a Class I area
8 from the southern end of the SAMI region and we're showing
9 results from the northern area or the northern portion of the
10 SAMI region.

11 Now, along the left-hand axis, that is extinction.
12 Visibility sciences prefer to talk about the light extinction
13 and the units of measure there is inverse megameters. Now,
14 sometimes you'll hear other units used, sometimes visual range
15 expressed in miles. But here we have the results following
16 the atmospheric modeling results and accumulating all the days
17 that were modeled for the SAMI process showing the results for
18 the base case, which essentially is equivalent to the 1990
19 emissions, and then looking into the future.

20 Earlier today we talked and we saw reference to A1, A2,
21 B1, B2, B3. But SAMI was becoming constrained with time and
22 resources and so the consensus was just to move forward with
23 the results for A2, B1 and B3.

24 Now, when we look at the individual bar charts, we're
25 looking at stack bar charts once again. And the very bottom

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1 of these bar charts says natural. If there was no air
2 pollution in the atmosphere, the sun that's coming from space
3 from the sun, there is a certain amount of scattering that
4 occurs naturally.

5 When I went outside for lunch today, I looked up and we
6 have beautiful blue skies. Well, the nitrogen compounds that
7 are in the atmosphere as well as the other gases cause a
8 scattering of the blue wavelengths of light. And so you do
9 lose some energy, some wavelengths of light coming to the
10 earth's surface from the sun just due to what's also called
11 ray lay conditions. That's another term that you'll hear.
12 But also are the -- that's natural loss -- natural scattering
13 of light.

14 Now, on top of that light blue bar in this graphic shows
15 a dark blue bar. And that shows ammonium sulfates. That's
16 the NH_4 , that's in parenthesis, $_2\text{SO}_4$. That's ammonium
17 sulfate. That's usually how we look at the fine particle, the
18 sulfur portion of the fine particles as ammonium sulfate.

19 And this shows that in the base case for Great Smoky
20 Mountains and Shenandoah that it is ammonium sulfate particles
21 that are causing most of the light scattering that's observed
22 at these two Class I areas.

23 But let me say also that these results are the same also
24 for the other Class I areas, too. These two were just put in
25 the report that way.

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1 As we look at emissions reduction strategies -- so in
2 1990 we have to remember what we had at that particular time
3 was the Clean Air Act Amendments had been -- Congress had
4 passed that and they were going to be implemented. And so
5 that is part of A2, as well as, I believe Mr. Nicholson talked
6 about Tier II. And there was other programs going on.

7 And so we see that what was being planned, what we knew
8 was on the way in terms of air laws and rules and regulations,
9 that the amount of sulfates contributing to visibility
10 impairment or to light extinction was going to be diminished
11 somewhat by 2010 and considerably more by 2040 because these
12 programs are taking time to be implemented. And SAMI was
13 looked out to 2040 because, for example, the Clean Air Act
14 Amendments of 1990, I believe they're supposed to be fully
15 implemented by 2010. Well, we look beyond that to see what
16 would be the benefits we hope for the resources out there. So
17 we looked at a time period out into the future.

18 As you reduce sulfur dioxide emissions, you can see the
19 level of light extinction decreases, and we see that with the
20 B1 and B3 strategies especially when we look --

21 Q. When you say the light extinction decreases, what does
22 that -- does that say something about visibility?

23 A. Yeah. If we have a high light extinction, it means I
24 can't see very well. I can't see very far. I can't see the
25 colors and textures of the mountains, for example, in our

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1 particular case. And so for light extinction, we want a low
2 number not a high number.

3 Q. So if light extinction decreases, visibility increases?

4 A. That is correct. And also, based upon what we know from
5 SAMI, as light extinction decreases, we're also decreasing the
6 amount of fine particles in the atmosphere.

7 Q. I'd like to draw your attention to two pages further
8 ahead, Page 73 in the electronic document, and -- which is
9 Figure 4.11.

10 MR. GULICK: And Your Honor, it is Page 4.16 in the
11 hard copy.

12 Q. There's a chart here as well.

13 A. Uh-huh.

14 Q. And could you tell us about this chart -- this figure and
15 how it may be different from the one we looked at before.

16 A. Well, the first change -- or the first difference is this
17 left-hand axis. Instead of talking about extinction or beta
18 extinction, we're expressing the results in terms of miles.

19 In SAMI it was decided to use miles or to use standard
20 visual range because we felt that in order to make a
21 connection with policy makers and the public, that they could
22 probably relate to that a little bit better than talking about
23 something in inverse megameters. These results here also are
24 showing the difference in change of visibility of looking at
25 that base case, the 1990 --

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1 Q. And how would the base case be shown?

2 A. We're looking at a change, a difference between the base
3 case and the modeling results for these different three
4 emission scenarios for 2010. So we're looking at a change
5 between those two.

6 Q. And what --

7 A. In miles, that is. In terms of standard visual range.

8 Q. And what does it show with respect to those changes?

9 A. Okay. Now, what we're looking at here is we're looking
10 at the annual average, not the best visibility days or the
11 worst visibility days, but we're looking at what was
12 considered the annual average at these Class I areas. And
13 these are the federally mandated Class I areas that SAMI
14 looked at in their assessment stretching from Sipsey
15 Wilderness in Alabama up to Dolly Sods in West Virginia. And
16 what we're seeing here is that as you reduce fine particles in
17 the atmosphere in particular, as you're reducing sulfur
18 dioxide emissions in particular, you have improvements in
19 visibility.

20 Q. I'd like to draw your attention to Page 76 of the
21 electronic document.

22 MR. GULICK: Which is, Your Honor, Page 4.19 of the
23 hard copy of Exhibit 1.

24 Q. And there is -- I'd like to draw your attention,
25 Mr. Jackson, to Figure 4.14 which is at the bottom of the

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1 page.

2 A. Uh-huh.

3 Q. And can you tell us about this figure and what it is and
4 how it was done, if you will.

5 A. Sure. Let's first talk about how it was done. This is
6 not real pictures. This is a modeling simulation using a
7 program called WinHaze. And there was consensus reached among
8 all parties that we could use this in the effects analysis for
9 visibility because to talk about a 13 -- or let's say a
10 16-mile improvement or a 3 -- I should say -- let me back up.

11 Between the base case in strategy A2 for Great Smokys, on
12 this particular day, July 15th, 1995, we're looking at a
13 3-mile improvement in visibility. Well, what in the world
14 does that mean? Well, we use pictures to try and convey that
15 message to policy makers and the public to help them
16 understand if we make these reductions, for example, in sulfur
17 dioxide emissions, what does it really mean for the person
18 that's viewing scenery in the Southern Appalachians? So here
19 we have the range of responses for this one particular day
20 that was modeled in the SAMI analysis.

21 Q. And so it reflects the changes based upon the different
22 strategy and the level of reduction of sulfate in particular?

23 A. That is correct. And also keep in mind that these
24 different days had different relative humidity factors, too,
25 and that would influence the results.

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1 Q. But these are modeling against just that one day,
2 July 15, 1995; isn't that right?

3 A. You are correct. So on July 15th, this is the results
4 for that day.

5 Q. And just so I understand, on the base day of July 15th,
6 1995, was the actual visual range 13 miles?

7 A. I cannot support -- confirm that that actually was that.
8 This is the modeling results that came out of atmospheric
9 modeling. So how to compare to what was measured in the
10 field, I don't have that information. But this is the results
11 from the atmospheric model put into WinHaze.

12 Q. Do you use photographic simulations of this kind from
13 WinHaze in your work?

14 A. Yes, I do.

15 Q. How do you use it?

16 A. I use it when I mentioned earlier about new sources of
17 air pollution, and one of the things, of course, that we are
18 looking at is how would a new source of pollution impact
19 visibility at a Class I area? And in order to convey to the
20 federal land manager what this might mean in terms of
21 visibility, WinHaze is one of the tools that we use so that
22 they can try and visualize that.

23 Also when I talk to the public and talk about air
24 pollution impacts that we know that are occurring in western
25 North Carolina or eastern Tennessee, I use WinHaze results

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1 from that also to communicate what we know in terms of current
2 impacts and also trying to look at, perhaps in an optimistic
3 way, what the future holds as we continue doing emissions
4 reductions.

5 Q. And so do you view the WinHaze software program as
6 generally accepted in the work that you do?

7 A. Yes. It's used among other air resource specialists in
8 the Forest Service, and it was also used as part of the SAMI
9 process as I mentioned. We did reach consensus to use it and
10 that was a diverse group of people, as has been mentioned
11 previously, who was involved with SAMI.

12 Q. You've indicated that reduction in sulfur dioxide
13 emissions -- was SAMI's conclusion that -- what was SAMI's
14 conclusion about the best way to improve visibility?

15 A. Well, from what I recall, SAMI's conclusion was is that
16 to make the greatest improvements in visibility would be to
17 make reductions in sulfur dioxide emissions.

18 Q. I'd like to draw your attention to -- this is in the same
19 Exhibit 1, Page 53, Figure 3.11. And this is something we've
20 seen before, but you weren't on the stand.

21 Mr. Jackson, are you familiar with this figure?

22 A. I am familiar with this figure, yes.

23 Q. And with respect to the -- with respect -- with respect
24 to the Class I areas that are in -- well, let me be specific,
25 Joyce Kilmer, Look Rock and the Great Smoky Mountains National

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1 Park and Shining Rock and Linville Gorge, do you have any
2 conclusion as to what needs to be done in order to improve
3 visibility at these sites?

4 A. Uh-huh. Well, when I've looked at this information in
5 the past, one of the things that I see, and we know this, that
6 the visibility problems that we have is a regional haze
7 problem and so reductions in sulfur or sulfate aerosol
8 concentrations in the atmosphere, which goes back, again, to
9 reducing sulfur dioxide emissions, are going to have to occur
10 throughout the region. It's going to have to occur in more
11 than just North Carolina.

12 But in terms of when I look at these results, I see that
13 sulfur dioxide emissions from Tennessee are particularly
14 important in order to try and improve visibility in the four
15 Class I areas that you mentioned.

16 But also important as part of that, in particular for
17 Shining Rock and Linville Gorge, we see that improvements or
18 reductions of sulfur dioxide emissions also need to occur in
19 North Carolina.

20 Q. Let me ask you, do you recall in SAMI whether the SAMI
21 model took into consideration the reductions that are being
22 required by the Clean Smokestacks Act in North Carolina?

23 A. No. This modeling predates the Clean Smokestacks Act.
24 But I can say that in looking at emissions recently, when you
25 look at -- between the B2 and B3 strategies, that is, in terms

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1 of sulfur dioxide emissions from utilities, that is the range
2 in which the North Carolina Clean Smokestacks Act is
3 following.

4 But there is no SAMI modeling to try and look at what
5 benefits that the North Carolina Clean Smokestacks Act will
6 provide directly to visibility. We're just inferring it.

7 Q. In looking for the Clean Smokestacks -- excuse me. In
8 looking for sulfur dioxide reductions, does SAMI provide any
9 information about where those -- where would be most effective
10 to get those reductions?

11 A. I believe that for western North Carolina, those Class I
12 areas, there was reference made to specifically reductions
13 that need to occur in Tennessee, but also it made reference to
14 other states also.

15 Q. And I think I was referring -- well, excuse me. I was
16 looking -- with respect to a sector that you would look to, is
17 there a sector that you would look to?

18 A. Oh, if I understand your question correctly, in terms
19 of -- the utilities is the sector in terms of where to look
20 for in terms of making emissions reductions in sulfur dioxide.

21 Q. And why is that?

22 A. Well, at that time, of course, costs are very -- are of
23 concern. But also, what is technologically available, too.
24 And my understanding at that time, and I think it's still true
25 today, that as a nation, and the utilities as a group have put

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1 considerable research into understanding what are available
2 control technologies for their sector. And so there are
3 viable options in terms of removing sulfur dioxide from the
4 gas stream.

5 When we're working on permits, we're looking at in terms
6 of new sources of air pollution, we're looking at at least
7 90 percent reduction of sulfur dioxide. But also, the cost
8 that's available. And when we look at the source sector that
9 releases the greatest amount of sulfur dioxide emissions, that
10 is with the utilities. And if we look at an individual
11 facility, with the large amounts of sulfur dioxide that are
12 being emitted from there, there is control technology that is
13 available and can do it at a reasonable cost.

14 Some of the numbers when I talk to state regulatory
15 agencies, a reasonable cost is a thousand dollars per ton of
16 SO₂ removal.

17 Q. And that's for what sector?

18 A. Well, for utilities. But also, that number came up while
19 we were doing the Best Available Retrofit Technology, the BART
20 analysis, for sources under the Regional Haze Program.

21 Q. I'd now like to refocus your attention back to the
22 subject of acidic deposition.

23 A. Okay.

24 Q. And first of all, I would like to have you describe
25 acidity, what that is. What is acidic deposition?

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1 MR. FINE: Your Honor, I would object to this line
2 of questions. TVA has a pending motion in limine on these
3 matters in terms of any testimony concerning acidic deposition
4 on the basis in the briefs we've already submitted on the
5 point.

6 We have -- we believe that under the *Clean Air*
7 *Markets Group versus Pataki* case, that the law is clear that
8 Congress has spoken as to how acidic deposition is to be
9 handled under Title 4 of the Clean Air Act, and that under the
10 *Pataki* decision, that is -- that preempts any additional
11 efforts, particularly as shown by North Carolina's interest in
12 eliminating the possibility of TVA obtaining or using
13 allowances for the control of acid rain in direct
14 contravention of the Congressional scheme.

15 MR. GULICK: Your Honor, we disagree. We believe
16 the question that the Clean Air Act does not in any respect
17 preempt a state nuisance action to reduce something which is
18 causing an actual problem in the state.

19 The Fourth Circuit has already looked at the general
20 question of whether or not a nuisance action is preempted and
21 determined -- agreed with this court that it does not. There
22 is nothing about the subject or the question that I have put
23 to Mr. Jackson about talking about what sulfur -- what acid
24 deposition is that has anything to do with allowances that TVA
25 may or may not use.

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1 And we believe that this is an untimely argument.
2 Sulfate testimony is clearly relevant to whether TVA is
3 creating a public nuisance. TVA's SO₂ emissions clearly are
4 relevant to the question of whether or not there is visibility
5 problems and also as to whether or not there is -- and we
6 believe that's what the testimony will show, to acid
7 deposition.

8 Mr. Jackson has already alluded in his testimony to
9 the concern about sulfate -- sulfate deposition as part of
10 this issue. This court has denied TVA's motion to dismiss.
11 There was a preemption issue there. And *Pataki* involves a
12 scheme of the state that actually directly dealt with the
13 actual transfer of emission -- of allowances. There's nothing
14 about the relief that the State of North Carolina is seeking
15 in this case against TVA that has to do with allowances.
16 We're seeking emissions reductions.

17 TVA has not established any of the required factors
18 for preemption, express preemption. Congress has done nothing
19 in this in the CAA. The exact contra is the case. They have
20 not occupied the field. The *Pataki* case expressly found that
21 the CAA Title 4 does not do this. That it does not preempt
22 the field. It's not sufficiently comprehensive.

23 And even where Congress has not completely displaced
24 state regulation in this specific area, state law cannot be
25 nullified unless it actually conflicts the relief that we seek

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1 with the federal law. There is nothing in what we seek in
2 this case that would actually conflict with the federal law or
3 the acid rain amendments. If the state seeks further
4 reduction, there is nothing in that that conflicts with the
5 acid rain amendments, the primary purpose of which is in fact
6 to reduce acid rain and sulfur deposition.

7 We believe the equitable powers of this court are
8 broad and that you're entitled to take evidence with respect
9 to acid deposition and to determine whether or not it
10 constitutes a nuisance in the State of North Carolina. Thank
11 you.

12 MR. FINE: Your Honor, we're addressing a point --
13 this is conflict preemption, a direct conflict between the
14 scheme enacted by Congress for how Congress has chosen to
15 regulate acid deposition in this country. It's not an
16 argument that's been previously presented to this court. What
17 we're talking about is North Carolina seeking a remedy which
18 by its very nature would prevent TVA from taking advantage of
19 the Congressional scheme in terms of how it would choose to
20 control its emissions that could lead to acid deposition,
21 emissions of sulfur dioxide with particular reference. And
22 that what we're talking about is North Carolina, much like New
23 York was trying to do in *Pataki*, is effectively trying to tell
24 TVA that we cannot use the allowance cap-and-trade system that
25 Congress has enacted. We believe that oversteps the bounds of

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1 the state's authority in the face of the Congressional mandate
2 as to how acid rain is to be controlled.

3 MR. GULICK: Your Honor, Section 116 of the Clean
4 Air Act expressly permits states -- gives states authority to
5 go beyond the Clean Air Act. There is nothing about
6 seeking -- in this case there is nothing about using a common
7 law remedy which the Fourth Circuit has upheld to abate a
8 public nuisance that says that TVA -- if this court were to
9 direct that TVA must reduce its emissions, there is nothing
10 about that that directly conflicts with any trading scheme
11 anywhere. It simply directs that TVA would have to reduce its
12 emissions to some particular level. There's no direct
13 conflict there. If that was a conflict, then the Clean
14 Smokestacks Act itself would be a conflict in the State of
15 North Carolina by requiring Duke and Progress to reduce their
16 emissions. The effect of that, of course, compels them to
17 reduce their emissions, but it is -- we would seriously
18 contend that that would be a grave overreading of what
19 constitutes a direct conflict with the federal program.

20 THE COURT: All right. I think I have both your
21 points so let me take a minute here to review what you've
22 said.

23 (Pause.)

24 THE COURT: All right. I'm going to overrule your
25 objection. I'm also going to take a 15 minute recess and then

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1 we'll continue with this testimony.

2 You may step down. Resume your seat in 15 minutes.

3 (Brief recess at 4:15 p.m.)

4 THE COURT: All right. Proceed.

5 WILLIAM A. JACKSON

6 DIRECT EXAMINATION (Cont'd.)

7 BY MR. GULICK:

8 Q. I believe -- thank you, Your Honor.

9 I believe my last question was what is acid deposition.

10 A. Okay. Well, acid deposition is the deposition of sulfur
11 and nitrogen compounds from the atmosphere. It comes in three
12 forms, though.

13 We've talked about haze earlier on. And when it's
14 suspended in the atmosphere, it's scattering light. But as
15 that comes across the landscape, it can be deposited on the
16 trees and on the soils. We call that dry deposition.

17 The next form that most people are commonly associated is
18 rainfall. A lot in the '80s we heard about acid rain. And so
19 the second form of deposition is rainfall or wet deposition.
20 So we have dry deposition, wet deposition.

21 And then the third area, a term is used occult or we talk
22 about cloud deposition. And cloud deposition, acidic
23 compounds can be quite high. Now, the compounds that we're
24 talking about are sulfur compounds as well as nitrogen
25 compounds. And the emission sources for nitrogen compounds

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1 include those sources that release nitrogen oxides, but also
2 ammonia. And though they are of concern, especially in the
3 scientific literature, we haven't seen evidence of too much
4 nitrogen deposition on the national forest here in western
5 North Carolina. But there is in the scientific literature.
6 For example, old growth spruce fir forest, those that are
7 found in the Great Smoky Mountains National Park, that may be
8 receiving too much nitrogen. Because they're older forests,
9 they don't need as much nitrogen to grow and so there is
10 nitrogen being saturated from those systems.

11 In the national forest that we have here, much of the
12 area -- there's a few exceptions, Joyce Kilmer, the Little
13 Santeetlah Watershed and all of Linville Gorge that are actual
14 examples of old growth and there's other old growth forests in
15 isolated pockets on the national forest.

16 But by and large, these forests when you look at them,
17 they've been cut at least once and these are actively growing
18 forests and they use the nitrogen that is being deposited.

19 Well, the main compound that we're concerned with is
20 sulfur in terms of being deposited on the forest. And again,
21 those come primarily from coal-fired electrical utilities as
22 the main source of sulfur dioxide being released in the eight
23 SAMI states, and in the eastern United States at large. And
24 when that's deposited, it can have effects to the resources.

25 Q. Could you describe what the effects are to the resources

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1 when sulfur is deposited.

2 A. Okay. When that sulfur comes down, many times it can
3 come down as sulfuric acid, H_2SO_4 . And bear with me as I go
4 through this because there is some chemistry involved here,
5 but it is quite an interesting process of how it affects the
6 biogeo chemistry of the forest.

7 This sulfuric acid, when it's deposited on the ground,
8 can disassociate. It breaks apart into two hydrogen atoms and
9 into a sulfate molecule. So let's just talk about these
10 hydrogen atoms. They both have a positive charge to them.
11 And soil has a negative charge to it. And so those are
12 attracted together. And over time you can have a build up of
13 the hydrogen ion concentration. The way that we measure
14 hydrogen ion concentration is by the pH scale, and we will see
15 a decrease of the pH over time as we continue to build up the
16 hydrogen ion concentration.

17 Now, the sulfur molecule --

18 Q. When you say decrease in pH, what does that mean?

19 A. It means that the soils are becoming more acidic. The pH
20 scale, neutral is 7, and we can go to one which is very, very
21 acidic. So we've seen, for example, in Linville Gorge, when
22 we measure soils right now, the pH is 3.5 which is quite
23 acidic. When pH gets below 4.5 aluminum, which is actually
24 one of the most abundant elements in the earth's crust,
25 becomes mobile and that aluminum can be biologically toxic.

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1 Now, I was talking about the sulfur compounds. When the
2 sulfur is disassociated from the hydrogen ions, it can, in my
3 mind, really take two pathways.

4 Now, the sulfur is a sulfate molecule. It has a 2 minus
5 to it. And so it can actually combine to the aluminum or iron
6 that's found in our soils. And that's one of the things to
7 keep in mind about the southeastern United States and the
8 geologies and the soils that have subsequently developed in
9 that sulfur has been retained in part over the historical
10 deposition that has occurred in the eastern United States. We
11 typically look back to around 1860. So as sulfur dioxide has
12 been released through industrialization, you know, and the
13 increased demand in terms of producing commodities and
14 electricity, a portion of that sulfur gets retained on the
15 soils and it's building up over time. But there is a point at
16 which the sulfur will no longer be retained by the soils.
17 There is a maximum amount.

18 Now, for that portion of a sulfur that does not become
19 retained by the soil, it can move into the soil water
20 solution. Now, when we talk about -- well, I think I'll be
21 getting to it. Because it has a 2 minus to it, it is looking
22 for an equivalent amount of positive charge ions to attach to.
23 And the ones that are typically -- that it will attach to are
24 calcium which has a 2 plus, magnesium which has a 2 plus, and
25 potassium which is just a plus. And so these three elements

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1 are referred to as base cations. They're really desirable to
2 have in forest soils. Not only will it help the vegetation be
3 healthy, maintain a healthy status, but also a portion of
4 those -- it's a natural process for them to move down into the
5 aquatic system also which will benefit them, which we can get
6 to in a minute.

7 But calcium, magnesium and potassium are essential for a
8 healthy forest growth. For example, if we think about trees
9 and we think about the large size of the trunk of the trees
10 and the crown with all the branches and with all the leaves,
11 there's a lot of cells that are there. And the primary
12 component of cell walls is calcium. So calcium is essential
13 for wooden structure in trees, but it's also essential for
14 cells in herbaceous vegetation also.

15 Magnesium I mentioned also. And the leaves are green
16 because there is chlorophyll in the leaves and that -- those
17 leaves are used to produce simple sugars through a process
18 called photosynthesis. This is primary production produced
19 food for that vegetation. And in the center of that
20 chlorophyll molecule is magnesium, and so magnesium is needed
21 for photosynthesis also.

22 So these base cations are very essential for vegetation
23 and they are going through a constant cycling process. So if
24 we're dealing with a hardwood forest, for example, in the fall
25 the leaves will fall. It comes in contact with the forest

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1 soils and eventually it becomes incorporated into the soil so
2 that it's available to be used by the vegetation again.

3 But when there's high concentrations of sulfur compounds
4 in the soil and it -- what has happened historically over time
5 as that sulfur moved into the stream water, it carried with it
6 an equivalent amount of calcium, magnesium, potassium removing
7 it from being cycled through the forest eco system. And so we
8 have seen a loss of base cations over time. Is base cation
9 loss a natural process? Well, yes, it is in part. But sulfur
10 deposition has accelerated the rate of base cation loss and
11 those base cations have been moved down into the stream water
12 and, of course, you know, they're out in the Gulf of Mexico or
13 some other places, you know, by this time.

14 Q. You had mentioned earlier that -- you made mention of the
15 mobilization of aluminum.

16 A. Uh-huh.

17 Q. Can you tell us about that.

18 A. Yes. Well, aluminum, as I mentioned earlier, is one of
19 the most abundant elements in the earth's crust. And when it
20 becomes available, which is typically below a pH of 4.5 in the
21 soils, that aluminum has a plus 3 charge to it, and it can
22 penetrate more easily into the fine roots of the vegetation.

23 Now, we care about what's going on with the fine roots
24 because that's where water uptakes can occur for the
25 vegetation as well as the nutrients. But because of the 3

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1 plus, this valence bonding, it can actually attach more easily
2 to the root systems than calcium, magnesium or potassium. But
3 vegetation does not need aluminum to grow. Matter of fact, at
4 high enough concentrations, it's biologically toxic.

5 And so what we have really is two things sort of going on
6 potentially over time. One is that aluminum is taking up
7 sites along the fine roots and the base cations, calcium,
8 magnesium, potassium, are not able to penetrate into the fine
9 roots to be used by the vegetation for growth, and so you have
10 a nutrient deficiency that can occur. But when aluminum is at
11 high enough concentrations, it begins to kill the fine roots
12 and there's only a certain amount of fine root mass that the
13 vegetation has at a particular time. It is being replaced
14 every year, but if aluminum is killing the fine roots, then
15 that means there's less area for the uptake of these base
16 cations.

17 But also, there's less area for water uptake. And water,
18 of course, is another essential thing to have healthy
19 vegetation. So effects from drought could potentially be
20 exacerbated because of fine root mortality that's due to
21 aluminum. And that's a big concern to us. We have seen
22 evidence of that in Linville Gorge of where we have very low
23 calcium -- or calcium availability in the soils. Mostly
24 calcium that is available at Linville Gorge is actually in the
25 trees in the overstory. And we have very high concentrations

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1 or what the scientists consider very high concentrations of
2 aluminum in the soil. And we have -- one of the measures that
3 scientists look at in terms of risk is the ratio of calcium to
4 aluminum. And generally speaking, below 1, that ecosystem may
5 be at risk of aluminum toxicity.

6 At Linville Gorge we have a .3 calcium to aluminum ratio,
7 so we don't have much calcium. And we have high
8 concentrations of aluminum. We have pH's that are well below
9 4.5. I believe around the neighborhood of 3.5 is the pH in
10 the soils at Linville Gorge. And so that represents a system
11 that is showing signs from effects from acidity.

12 But another thing to keep in mind also about the Linville
13 system is the geology that it was derived from and the geology
14 is such that it began with a low amount of base cations. But
15 we've done retrospective modeling that perhaps I can talk
16 about in a few minutes on stream water.

17 Q. Now, is there an effect on stream water as part of this
18 process?

19 A. Yes, there is. And again, there's a couple effects that
20 can occur. I always have to remind the public when you see
21 the river rise, it's not because the rain fell directly in the
22 channel where the stream is. It's because the water fell on
23 the watershed. And as we have deposition coming down in the
24 rainfall or through dry or through cloud water, it's going to
25 react with the soils that are thin at these high elevations.

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1 There is low microbial activity. And as it goes down into the
2 soil water, it will move downslope into the stream. And in
3 certain situations where we have acidification going, the pH
4 can be dropped which can have an effect biologically to
5 aquatic organisms, as well as aluminum can reach high
6 concentrations in the stream water.

7 And we've had situations on the George Washington
8 National Forest in northern Virginia where trout have died,
9 brook trout in particular, which is actually considered a
10 relatively acid tolerant species. But when they did autopsies
11 on these trout that they found floating downstream, they
12 looked at the gills and they found very high aluminum
13 concentrations.

14 What the fisheries biologists told us is that the
15 aluminum that was on the gills caused the gills to produce
16 mucous which caused the trout to suffocate due to lack of
17 oxygen. So aluminum can have direct, you know, and indirect
18 effects to the mortality of brook trout also.

19 But one of the measures that we really rely upon, our
20 barometer, if I can use that analogy, is something called the
21 acid neutralizing capacity. You'll also see it referred to as
22 ANC. Now, how do we calculate ANC? Well, I've talked about
23 how important base cations are: Calcium, magnesium,
24 potassium. We also add in sodium. And what we hope is that
25 it's a really large, obviously positive number, a large

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1 number. And then what we're going to do is we're going to
2 subtract from it the acid anites, the sulfates and the
3 nitrates. We also subtract chloride from that. And what you
4 hope is that you have a large, positive number. That means
5 that there's buffering capacity. There's an ability for that
6 system to buffer acid inputs coming in.

7 So for example, the limestone areas in Kentucky, they
8 have fairly high ANC values because the limestone has an
9 abundance of base cations available to neutralize any acid
10 inputs.

11 But as I mentioned earlier, the geology here in western
12 North Carolina and the soil that developed from that had a low
13 amount of bases to start with. And the replacement of bases
14 over time is a very slow process because we're talking about
15 the weathering of rock.

16 Now, another possible mechanism for base cations to
17 increase in soils is from dust in the atmosphere. But those
18 numbers have really gone down over the decades due to no till
19 practices in the agricultural industry. In other words, we're
20 keeping our topsoil in place.

21 So we have the base cations that we're losing. They're
22 not being replaced at adequate rates. So in the streams we
23 hope to have a high positive number in terms of acid
24 neutralizing capacity. And we do have systems that have ANCs
25 greater than 50, a number considered by many scientists as an

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1 indicator that there's adequate buffering not only at that
2 time, but into the immediate future also. But also we do have
3 systems like the Linville Gorge where the acid neutralizing
4 capacity, when we collect a water sample from the streams,
5 that are negative and they can be as low as negative 10,
6 negative 14 that we've observed in Linville Gorge.

7 So we have a range that we've collected. We've collected
8 water samples -- well, this is -- this is really eastern
9 Tennessee, western North Carolina, and a portion of the
10 upstate of South Carolina, we've collected 256 water samples.
11 And as I've mentioned, we've looked at those in terms of their
12 ANC values and we feel that that's an initial indicator of the
13 health of those water streams.

14 Q. Did the issue of acid deposition get examined in SAMI?

15 A. Yes, it did. It was one of the three effects areas that
16 were focused on.

17 Q. And I'd like to draw your attention to Exhibit 1, Page
18 97. That's the electronic page.

19 MR. GULICK: And Your Honor, that's Page 6.4 of the
20 hardcover document.

21 If you could pull up this Table 6.1 at the bottom of
22 the page.

23 Q. Are you familiar with this table, Mr. Jackson?

24 A. Yes, I am.

25 Q. Could you tell us about it.

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1 A. Uh-huh. This is one way to use acid neutralizing
2 capacity values that are measured in streams to try and give
3 an indicator of the health of a stream.

4 Now, the research that's been done, a lot of attention
5 has been focused on brook trout. And the reason why brook
6 trout has been looked at, it's the native trout species in the
7 Southern Appalachian Mountains. It's of large interest to
8 fishermen and so a lot of the work that has been done at
9 Shenandoah National Park focused on brook trout.

10 And using their research findings that have been done --
11 that has been done at Shenandoah National Park, we have some
12 break points in terms of these ANC values. And if we start at
13 the bottom of the table, looking at ANC or acid neutralizing
14 capacity values between 50 and 150, these are areas that are
15 considered suitable for brook trout. But one of the things to
16 keep in mind, it doesn't mean that it's suitable necessarily
17 for other aquatic organisms. For example, a group of
18 organisms called diatoms. Or the fish -- the brook trout are
19 going to be feeding on insects in the streams, caddisflies and
20 mayflies. They may be sensitive at this level or in the next
21 category down, between 20 and 50. These -- the ANC values
22 between 20 and 50, these are potentially sensitive and these
23 are streams that we're quite concerned about in trying to
24 understand how sulfur deposition will hopefully improve these
25 systems or whether they will improve at all.

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1 And when we get to ANC values between 0 and 20, now these
2 are systems that are episodically acidic. What do we mean by
3 that? Well, there's probably refuges where the brook trout
4 and perhaps other trout species like brown trout can hang out.
5 Their populations, they may not be the healthiest, they may
6 not have great weight. There might be certain life stages,
7 maybe a certain year's life stage is missing from the stream.
8 But in these streams, and we've actually made measurements of
9 this -- of a stream that was in this category. But during
10 rain events, sometimes they can be quite acidic. And what
11 we'll see is that for a short period of time, the ANC drops
12 from 20 down to negative values. And so that's what we mean
13 by episodically acidic. So you have this short-term high
14 acidity pulse that can occur in the stream and so we can see
15 biological effects at that time.

16 Now, when we get to ANC zero, basically, that's a system
17 that can't support brook trout at all. Does it mean that
18 you'll never -- if you have a stream where you've measured ANC
19 zero, you might find brook trout in there because they might
20 be able to find little pockets to hang out. But by and large,
21 you don't have fisheries available in that stream anymore.

22 Q. I'd like to go to the next -- I believe it's the next
23 page, Page 98. And it's 6.5, I believe, in the hard copy.

24 There's a table, there's a figure there 6.2 which I think
25 you now have up in front of you.

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1 A. Uh-huh, I do.

2 Q. And this is a map. What is this map and what does this
3 show?

4 A. Okay. Well, there's really a couple pieces of
5 information that are on here. You'll notice first in the SAMI
6 boundary, and I guess I can sort of outline that a little bit
7 on the two sides. But in this area here, this is where we
8 were doing the assessment going on. And you see a green
9 shaded area. This is the area where the geology is sensitive
10 to acidic deposition, but also this is high elevation, too.
11 So you have a combination based upon elevation and geology
12 that -- of areas in the Southern Appalachians that are
13 sensitive to acidic deposition.

14 The map is also showing the streams that were used in the
15 effects modeling, and the model that was used for this
16 particular case was the MAGIC model, and the MAGIC model was
17 used to evaluate the different SAMI scenarios in the future.
18 It shows streams here that have ANCs less than zero and we
19 have ANCs between zero and 20. And when you look at those,
20 you can see how they're lining up with these areas at risk in
21 terms of the geology and elevation.

22 By the way, I have used this map for my work also to
23 identify areas at risk; and in part, we've used it to try and
24 go and look at other areas. A lot of the work that we've done
25 recently has occurred after the time period that SAMI complied

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1 their information. So I talk about the 256 streams.

2 Q. Let's go to Page 103 on the electronic copy.

3 MR. GULICK: And that's Page 6.10, Your Honor, in
4 the hard copy.

5 Q. And I wanted to draw your attention, Mr. Jackson, to the
6 figure, I think it's the figure above 6.6, if I can see
7 correctly. It's the upper one.

8 A. Uh-huh.

9 Q. Are you familiar with this?

10 A. Yes, I am.

11 Q. And could you explain to us what's going on with this
12 figure.

13 A. Sure. Here we have a selection of Class I areas. Again,
14 starting in the southwestern portion of the SAMI area, we have
15 Sipsey Wilderness, and proceeding towards the northeast we end
16 in Dolly Sods in West Virginia. And these different Class I
17 areas are really showing what will happen or what the estimate
18 is for sulfur deposition as you go from a base case to having
19 greater sulfur dioxide reductions based upon the SAMI
20 strategies of A2, B1 and B3.

21 And what -- we've gone from emissions and once these were
22 put through the atmospheric modeling, the atmospheric modeling
23 results are showing that as you reduce sulfur dioxide
24 emissions, then especially when we look at B1 and B3, a lot of
25 those reductions are from the utility sector, but as you make

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1 these sulfur dioxide reductions in terms of emissions, then in
2 effect you will be lowering the deposition in these Class I
3 areas.

4 Q. I notice that the bars are higher in this one that's
5 above Noland Divide Great Smoky Mountain, North Carolina. Is
6 there a reason for that? It seems a lot higher than the
7 others.

8 A. Well, there is a reason in that there is a -- this
9 particular site, because there was data collected during the
10 Mountain Cloud Chemistry Project on cloud water, at this
11 particular site SAMI chose to use the results from the
12 Mountain Cloud Chemistry Project in terms of estimating the
13 cloud deposition.

14 Let me try and make this simpler. In terms of Sipsey,
15 it's a lower elevation site. Cloud deposition is not much of
16 a problem. And the assumptions used for James River Face,
17 White Oak and Dolly Sods in terms of cloud water was based
18 upon a historical statistical model called ASTRAP. But Noland
19 Divide was treated differently and there was consensus reached
20 by the participants in SAMI to do that because we had cloud
21 water deposition near Noland Divide.

22 And this just shows, and I don't believe I've mentioned
23 this, in terms of deposition, cloud waters can have a very
24 high concentration of sulfur and nitrogen compounds. A
25 general rule that we've used, and it's not always true, but if

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1 you measure wet deposition and you want to estimate the dry
2 deposition portion, they'll be equivalent. But if you want to
3 estimate the cloud water, add together wet deposition plus the
4 dry and that's equivalent to about what the cloud deposition
5 will be. But that's just a general rule. It's not, you know,
6 that's used by my people. So the point I want to make is that
7 when we have clouds coming across the landscape, the
8 deposition can be very high.

9 Q. I want to draw your attention to Exhibit 1, Page 53.
10 It's electronic -- we've been here before.

11 MR. GULICK: It's Page 3.18, Your Honor, on the hard
12 copy.

13 Q. And I want to ask you -- we've talked some about the
14 upper chart here before, but we've not talked about the figure
15 below. Could you talk to us to about the Figure 3.12.

16 A. Okay. Well, this figure is showing a different pattern
17 than what we saw with the aerosol concentrations. In Figure
18 3.11, again, that was concentrations of aerosols in the
19 atmosphere. Remember I talked about the dry deposition coming
20 across the landscape. Also, that figure is somewhat
21 representative of what we would anticipate from cloud
22 deposition.

23 But here with wet deposition, we start seeing different
24 regions, different -- I should say different states that are
25 contributing to the wet deposition. The deposition that's

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1 coming in from the rainfall.

2 So if we look at Joyce Kilmer as well as Shining Rock and
3 Linville Gorge, we can see that sources from Alabama and
4 Georgia are important in terms of sulfur deposition. Now, for
5 some of us, it's like, well, sure that makes sense because
6 our -- a lot of our rainfall comes out of the Gulf of Mexico.
7 And with that rainfall pattern, what states is it crossing
8 over? Well, it's moving across Georgia as well as Alabama.

9 Now, we do see the importance of North Carolina in --
10 with Linville Gorge as well as the importance of Tennessee.
11 And so when I look at these results, I see that the terms of
12 reducing sulfur in rainfall, it's important that sulfur
13 dioxide reductions occur in the states of Alabama and Georgia
14 as well as Tennessee, and again in the case of North
15 Carolina -- I mean, in the case of Linville Gorge, excuse me,
16 North Carolina. And we see to a lesser extent Kentucky and
17 other areas of the domain.

18 Q. Once again, with respect to this chart as the other, does
19 this chart take into -- or does this figure take into
20 consideration the reductions that were being required -- were
21 being required by the Clean Smokestacks Act with respect to
22 North Carolina?

23 A. This is a strategy that was done and so the emissions
24 were not reduced specifically for the North Carolina Clean
25 Smokestacks Act. The A2 strategy does not have Clean

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1 Smokestacks Act built into it at all.

2 Q. That's because it predated it.

3 A. Exactly, yes, that is, uh-huh.

4 Q. Now, this talks about wet deposition, but I think you
5 very quickly had mentioned the other chart that's above this
6 on page -- the one right above Figure 3.11 with respect to
7 acid deposition. Is that -- is that figure also relevant to
8 the acid deposition?

9 A. Well, it is. When we look at the results in terms of
10 this chart, again, now we're talking about aerosol
11 concentrations in the atmosphere. And as I mentioned, you
12 know, when they're suspended in the atmosphere, we care about
13 that in terms of its contributions to visibility impairment.
14 But as that air moves across the landscape, those particles
15 can get deposited on the forest canopy and on the soils, and
16 so that's dry deposition.

17 But also talking with the atmospheric modelers during the
18 time of SAMI, they suggested in terms of the two results that
19 in terms of cloud water, that the results here are -- would be
20 more representative of what -- in terms of making reductions
21 of sulfur and cloud water.

22 And so as I believe I mentioned earlier when we again
23 look at Joyce Kilmer and Shining Rock and Linville Gorge, we
24 see that sulfur dioxide emissions sources in Tennessee are
25 important in terms of reducing dry deposition and deposition

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1 of cloud water. And based upon the emissions inventory, we
2 know that coal-fired utilities are the major contributors to
3 sulfur dioxide in Tennessee.

4 And again, though, when we look at Linville Gorge, we see
5 the importance of North Carolina, but also, we see
6 contributions in this chart from Alabama and Georgia, as well
7 as Kentucky and the central states.

8 Q. Thank you. Since SAMI was completed, have you and those
9 that you work with in the Forest Service done further research
10 with respect to acid deposition?

11 A. We have. Matter of fact, we started during the SAMI
12 process. And one of the first studies that I worked with in
13 terms of funding was with our Forest Service research lab
14 called Coweeta Hydrologic Lab and the researchers there. And
15 there we started a study. It took us, geez, I think it
16 probably took us five years to collect all the data and to run
17 the modeling, but we used the same model that SAMI did for the
18 terrestrial system and it's called the Nutrient Cycling Model.
19 The acronym is NUCM, N-U-C-M. And we started at Joyce Kilmer
20 collecting data for that. Actually, we were building upon
21 research that had already started, started at Joyce Kilmer in
22 the Little Santeetlah Watershed. The Little Santeetlah
23 Watershed is one of these unique areas in that it is an old
24 growth forest. It's well-known for the Joyce Kilmer Memorial
25 Forest where you will see old growth there. And Coweeta was

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1 doing some studies there.

2 And so I asked them to begin evaluating if we had sulfur
3 reductions and what that would mean. And for the Coweeta
4 study we looked at a hundred percent increase in sulfur
5 deposition and a 50 percent decrease in keeping things
6 constant.

7 Once we got the model and the data collected for Joyce
8 Kilmer, then we next moved on to Shining Rock Wilderness.
9 Now, there we did things a little bit differently than Joyce
10 Kilmer. One of the things in Joyce Kilmer is the plots were
11 spread from the high elevation near the ridge top down into
12 the cove forest. But in Shining Rock, we found -- we selected
13 a sensitive area, an area that we thought was sensitive based
14 upon the geology. And so we had a real narrow area where we
15 did the modeling or collected the data for the modeling.

16 And once we obtained the data that we needed to for
17 Shining Rock, the final area that we moved to was Linville
18 Gorge. And in there we did our modeling in a sensitive area.
19 What I mean by sensitive area, sensitive to acidic deposition,
20 we believed, in Linville Gorge in the northeastern corner.

21 Q. I'd like to draw your attention to Exhibit 313 and ask if
22 you can identify what this document is.

23 A. This is a document, the results from a contractor for the
24 Forest Service, and I was the contracting officers'
25 representative. I was the person that the contractor worked

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1 with. I helped design this study also. But we were looking
2 at what the future looked like in terms of stream chemistry,
3 specifically for Shining Rock Wilderness.

4 This is a report that uses the MAGIC model. And this was
5 the first time beyond -- well, I had exposure to the SAMI
6 model -- excuse me, the MAGIC model during the SAMI process
7 and I became interested in trying to utilize that tool for the
8 national forest. And so here, because SAMI emissions
9 reductions in modeling were available, we used those results
10 to try and understand what would happen at Shining Rock
11 Wilderness. Now, the data set that we used --

12 MR. FINE: Your Honor, if I may interpose an
13 objection on the grounds of hearsay. This is a document that
14 was not prepared by any government agency. It was prepared
15 for a government agency. It was prepared by private
16 contractors as the face of the document itself indicates.

17 MR. GULICK: Your Honor, Mr. Jackson has just
18 testified that he was the contracting agency and it was done
19 for the U.S. Forest Service by -- it may have been by private
20 contractors, but it was done for the U.S. Forest Service as it
21 says right on the face. And Mr. Jackson has already testified
22 that he was the contracting -- the official -- I'm not sure
23 the quite word he used -- for the U.S. Forest Service for
24 this.

25 So I believe that the government frequently uses

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1 private contractors to do government work for them and that
2 does not prevent it from being a public record of the U.S.
3 government. And besides which, Your Honor, contracting
4 agencies -- agent, Mr. Jackson is here to testify about it and
5 he can be cross examined about it.

6 THE COURT: What part did Mr. Jackson play in
7 obtaining this information? What does he know about the
8 authenticity of it?

9 MR. GULICK: I believe, Your Honor, that if we're
10 allowed to inquire, he'll be able --

11 THE COURT: The credibility of it, I guess is a
12 better word.

13 MR. GULICK: Excuse me, the credibility of it?

14 THE COURT: Yes.

15 MR. GULICK: He probably --

16 THE COURT: Did he participate in it in any way?

17 MR. GULICK: Well, Your Honor, I believe he said
18 that he was involved in designing the study. Perhaps if we
19 were allowed to inquire, we'd be able to learn further about
20 that. We'd be able to get the answer to that question.

21 THE COURT: Tell me a little bit more about it.

22 THE WITNESS: Okay. I'll be happy to. This was a
23 study using Forest Service funding where I worked with the
24 contractor in terms of the design as well as providing them
25 the field data in terms of water chemistry and soils data.

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1 That was from the NUCM study that I just talked about briefly,
2 and also worked with the contractor in terms of the different
3 strategies that should be used, and as well as working with
4 them in talking through what SAMI did and included in the
5 analysis.

6 I also was a reviewer of a draft report and the
7 contractor didn't get paid until I said it was final.

8 THE COURT: I don't think we have enough evidence of
9 reliability here, so I'm going to sustain the objection unless
10 you can get some more information about how this was
11 developed.

12 All right. Go ahead with your next question.

13 MR. GULICK: Thank you, Your Honor.

14 Q. Mr. Jackson, what is the -- what would be the result for
15 the national forest -- or the forest and the streams that you
16 described from further acid deposition if it continues at the
17 present rate?

18 A. Okay. If it continues at the present rate, and what our
19 current understanding is that right now is implementation of
20 the Clean Air Act Amendments of 1990, as well as the Clean
21 Smokestacks Act that's currently the sulfur dioxide emissions
22 reductions that are going to occur, and with that what we
23 expect is that many of our watersheds will continue to lose
24 base cations. We'll be able to see indications of that if we
25 go out and do inventory and monitoring work in the future.

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1 And looking at streams that we've sampled in the past, we
2 wouldn't be surprised if we didn't see lower ANC values.

3 We are also going to see more systems become acidic.
4 That means they will not have buffering capacity for sulfur
5 compounds. We anticipate that certain areas will increase --
6 or decrease in soil pH and aluminum will become mobile and we
7 would anticipate more areas will be experiencing that, and I
8 described about the effects in terms of aluminum toxicity that
9 would occur.

10 There is, within the realm of possibilities based upon
11 the scientific literature that we know, that, for example,
12 with Linville Gorge, it's not unexpected or unreasonable to
13 assume that we may begin to see crown diebacks in the
14 overstory of that -- that forest has never been harvested
15 before and it's an old growth forest. And so in order to have
16 adequate supplies of calcium, the calcium is tied up in the
17 vegetation and the overstory and so the soils are no longer
18 going to be able to support the overstory at Linville Gorge.

19 There may be a few streams, there may be a few streams
20 that ANC will improve because they're near ANC 50 at the
21 current time. And one of our benchmarks to look for
22 improvements is seeing streams move to ANC values above 50.
23 And based upon the current laws, rules and regulations that
24 are in place as of today, we expect some streams to improve.

25 But by and large, we expect most streams and watersheds

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1 to continue to lose acid neutralizing capacity, especially
2 because they've been retaining sulfur for so long. And as
3 they reach maximum sulfur absorption capacity, the sulfur that
4 is deposited from the atmosphere will move into the soil water
5 solution and carry with it an equivalent amount of base
6 cations, and so we'll continue to lose calcium, magnesium and
7 potassium from the soils.

8 Q. So as the -- would you describe the acidification -- how
9 would you describe the acidification of the national forest in
10 the Southern Appalachians now? Is the problem stable or is it
11 solved?

12 A. No, we don't believe that it's solved and we don't
13 believe it's stable either. We believe, based upon the
14 scientific evidence and the modeling that we've done, that
15 we're going to continue losing base cations. That systems are
16 going to continue to acidify. And we need to have really
17 major reductions in sulfur dioxide emissions in order to get
18 the sulfate deposition -- the total sulfur deposition down.
19 Our current estimates, based upon work that we've done, is
20 sulfur deposition right now for many of our catchments may be
21 between 20 and 40 kilograms per hectare. That probably will
22 need to be reduced down to 3 to 5 kilograms per hectare in
23 order for a majority of these watersheds to turn around and
24 start improving in terms -- and seeing an increase in the acid
25 neutralizing capacity in the streams.

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1 Q. And what is it going to take to get that?

2 A. That is going to take making emissions reductions in
3 those areas from those sources that are having an impact on
4 western North Carolina. We've talked about some of those
5 things, but certainly the coal-fired utility industry as a
6 whole, we will be looking for them to make major reductions in
7 sulfur dioxide emissions; but those are going to have to occur
8 not only in North Carolina, but also adjoining states of
9 Tennessee and Georgia, also Alabama and Kentucky. But really,
10 like the regional haze problem, it also is a regional problem
11 so we're going to need to have reductions in the eastern
12 United States also to really talk about the levels that we're
13 talking about, 3 to 5 kilograms per hectare of sulfur, we're
14 talking about a major reduction in sulfur dioxide emissions.

15 Q. How would you describe the current situation of
16 visibility in the national forest? Is that still an issue of
17 regional haze?

18 A. Yes, it is. It is a problem, especially on days when we
19 have stagnant atmospheric conditions. And how I describe that
20 to people is you go outside, you can't really feel the wind on
21 your face. There's very little wind movement that's going on.
22 And on days that are really hot, those are the days that we
23 have the greatest electrical generation going on in order to
24 meet our electrical demands to cool our homes and businesses.
25 And so during those times in particular when we have the worst

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1 visibility are on those days.

2 And we still have a frequent occurrence of poor
3 visibility here in the Southern Appalachians. We have been a
4 participant with the Regional Haze Program and we hope that
5 that will turn around by 2064, but the initial analysis that
6 was done, let's say between now and the year 2018, though
7 there was planned to be improvements -- and I need to be --
8 caution that because with the Clean Air Interstate Rule being
9 vacated last Friday, there's some questions on whether we will
10 be able to attain visibility improvements that were
11 anticipated with implementation of that ruling.

12 Q. With respect to improving visibility and improving the
13 acid deposition situation in the Southern Appalachians that
14 you've been discussing, are reductions in emissions of SO₂
15 going to be required of the Tennessee Valley Authority to
16 achieve that?

17 A. Yes.

18 Q. And would that be in the state of Tennessee?

19 A. Well, it would also -- not only the state of Tennessee,
20 but my understanding is the Tennessee Valley Authority also
21 has facilities in Alabama and Kentucky and it would
22 possibly -- it would involve those states potentially also.

23 Q. Thank you. Mr. Jackson, earlier today there had been in
24 the questioning of Mr. Nicholson, there had been brought up a
25 facility called Blue Ridge Paper. Are you familiar with Blue

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1 Ridge Paper?

2 A. Yes, I am.

3 Q. And you heard the description -- were you present in the
4 courtroom when Mr. Nicholson was testifying?

5 A. Yes, I was.

6 Q. And did you agree with -- is your understanding, then, of
7 the situation consistent with what you heard from
8 Mr. Nicholson?

9 A. I believe it is, yes.

10 Q. Does the -- does the U.S. Forest Service have concerns
11 about Blue Ridge Paper?

12 A. Yes, we have and we made it part of the public record
13 with the Regional Haze State Implementation Program that North
14 Carolina put together. And in there we did do some modeling
15 using the same model that was used by VISTAS for individual
16 sources. It's a model called CALPUFF. And in that we modeled
17 all the sources of sulfur dioxide as well as the other
18 emissions from -- excuse me, from Blue Ridge Paper. And we
19 see that, you know, there's -- that particular source is a
20 significant contributor to visibility impairment at Shining
21 Rock Wilderness.

22 And so that facility does concern us and we believe in
23 order to attain the national goal of no manmade impairment in
24 Shining Rock, reduction of sulfur dioxide emissions will have
25 to occur at Blue Ridge Paper.

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1 Q. Have you communicated your concerns about that or the
2 Forest Service's concern about that to the Division of Air
3 Quality?

4 A. Yes, that was in a letter from Marisue Hilliard who is
5 the forest supervisor for the national forest in North
6 Carolina. But she also is federal land manager, and in her
7 comments on the North Carolina State Implementation Plan for
8 Regional Haze, she brought this issue up.

9 Q. Have you discussed it with the Division of Air Quality
10 personnel?

11 A. Yes, I have. In particular, I remember discussing it
12 with Sheila Holman before -- I mean, common courtesy is to
13 call people, and I talked to her about the modeling results.

14 Q. And to your knowledge, has the State of North Carolina
15 made a decision at this time with respect to the cost
16 effectiveness of reducing sulfur dioxide emissions of that
17 facility?

18 A. In our conversations that we had face-to-face with Laura
19 Booth and other members of the North Carolina Division of Air
20 Quality as part of the process for the regional haze, they
21 expressed to Marisue Hilliard as well as myself of why
22 emissions reductions are not planned for the BART -- or for
23 the -- well, not only BART but nonBart sources at Blue Ridge
24 Paper. That is, the costs are considered excessive at this
25 time in comparison to, for example, the utility industry. My

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1 understanding, if I recollect things, the utility industry,
2 you're looking at sulfur -- costs for sulfur dioxide
3 reductions of about a thousand dollars per ton. And I believe
4 Blue Ridge Paper was considerably above that. Three to six
5 thousand is the number that comes to my mind.

6 And so we understand that, you know, that these have to
7 be made on a case by case -- the utility industry represents a
8 different sector than pulp and paper. The pulp and paper
9 industry has to compete in international markets and that may
10 be excessive at this time. But what we were pleased to see
11 was making it a part of the public record, that North Carolina
12 Division of Air Quality has notified Blue Ridge Paper, this is
13 my words, you should expect by 2018, you know, to be making
14 reductions. And a thousand dollars per ton may not be
15 reasonable at that time. It may be considerably higher.

16 Also, I should note at the same time, even though
17 Progress Energy has made significant reductions at the Skyland
18 plant here in Asheville, they also received a letter
19 suggesting -- saying that they need to make further reductions
20 of sulfur dioxide prior to 2018 also.

21 Q. And that was from --

22 A. That was from --

23 Q. -- Division of Air Quality?

24 A. -- Division of Air Quality.

25 And that was part of the public record for the regional

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1 haze in one of the appendices for North Carolina SIP.

2 Q. May I ask you if you as a representative of the forest
3 service are satisfied with the current attention the State of
4 North Carolina is paying to Blue Ridge Paper?

5 A. Yes, we are, but we are looking forward to the
6 opportunity of working with the state as well as Blue Ridge
7 Paper, perhaps other stakeholders, of really starting to
8 address this issue because we think it's going to take time to
9 find reasonable solutions.

10 Q. You think that it is going to take time?

11 A. Yes, we do.

12 Q. I do want to ask you about the cost per ton for Blue
13 Ridge Paper. Are you sure of your figures or is it possible
14 that they're higher than that?

15 A. No, I'm not sure of my figures. But I do know that --
16 what I do distinctly remember is that the cost -- what was
17 said to us -- dollar figure probably was given and I've
18 forgotten, but that the cost figure in terms of dollars per
19 ton is considerably -- considered considerably higher than
20 coal-fired utilities.

21 MR. GULICK: Thank you.

22 Bear with me just a moment, Your Honor.

23 (Co-counsel conferred.)

24 MR. GULICK: Your Honor, I would like to move into
25 evidence, Your Honor, his curriculum vitae which was

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1 Plaintiff's Exhibit 440.

2 THE COURT: All right. Let that be admitted.

3 (Plaintiff's Exhibit Number 440 was received into
4 evidence.)

5 MR. GULICK: And I have no further questions at this
6 time. Reserve for redirect.

7 THE COURT: All right. Counsel for TVA.

8 CROSS EXAMINATION

9 BY MR. FINE:

10 Q. Good afternoon, Mr. Jackson.

11 A. Good afternoon.

12 Q. Good to see you again.

13 A. Thank you.

14 Q. I'm going to try and keep this as short as I can, but I
15 apologize if I don't. I'm going to be doing a little jumping
16 around.

17 A. Uh-huh.

18 Q. So bear with me.

19 A. Sure.

20 Q. If I get you confused, you please let me know.

21 A. I will do that. Thank you.

22 Q. I'd like to, first of all, just to hit a couple of points
23 in your curriculum vitae that's been introduced into evidence
24 as Plaintiff's Exhibit 440.

25 A. Uh-huh.

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1 Q. Mr. Jackson, do you have a copy of that document up
2 there?

3 A. No, I do not in front of me.

4 Q. Just a moment, please. That's the trouble with this
5 electronic world we live in, Mr. Jackson. Sometimes the
6 actual hard copy is hard to find.

7 A. Uh-huh. I'm not seeing anything at this time.

8 (Pause.)

9 MR. FINE: Thank you, Ms. Gillen. I appreciate it.
10 And thank you, Madam Clerk.

11 Q. Mr. Jackson, first of all, I'd like to draw your
12 attention to a point that's been made on Page 2 of your
13 curriculum vitae. If I could direct your attention towards
14 the -- towards the middle of the page. There's a heading
15 VSMOKE and VSMOKE-GIS.

16 A. Yes.

17 Q. Do you see that, sir?

18 A. Uh-huh.

19 Q. And correct me if I'm wrong, but I believe that's
20 referencing your role in the Prescribed Burning Program for
21 the Forest Service.

22 A. That is correct.

23 Q. And if you could, please describe for us what is your
24 role with the Prescribed Burning Program.

25 A. Okay. Well, we've talked an awful lot about how air

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1 pollution has impacted the national forest. We've talked
2 about that. But the Forest Service also by their management
3 activities has an effect on air quality, and one of the
4 largest ways that we impact air quality is through our
5 Prescribed Fire Programs.

6 And so what I've worked with here is developing what's
7 called a user interface of a model that was developed by a
8 Forest Service researcher to try and predict the downwind
9 concentrations of particulate matter from prescribed fires.
10 It also predicts carbon monoxide because that's a large
11 concern to our firefighters that are on the line.

12 Q. Mr. Jackson, my understanding is that prescribed fire can
13 contribute to particulate matter emissions.

14 A. That is correct. Particularly PM_{2.5}. We estimate that
15 70 percent of particulate matter emissions from prescribed
16 fires is PM_{2.5}.

17 Q. So in a sense, the Forest Service can create some
18 problems for air pollution generally.

19 A. That is correct. And so we try and manage our air
20 pollution. We have some -- there is some differences with us
21 also versus a stationary source. Typically a stationary
22 source is in one spot. You can't pick it up and move it. And
23 most likely, it's going to be emitting pollutants every day.
24 Whereas, when we're doing prescribed fires, it could be
25 anywhere from between 20 acres in size up to perhaps

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1 1500 acres in size, but we're moving those around the
2 landscape.

3 Also, we're choosing which days to set those prescribed
4 fires and so we're looking for conditions in which we won't
5 burn too much of the woody material. We call that available
6 fuels. As well as we're looking for days when the atmosphere
7 is favorable to disperse the pollutants to a sufficiently low
8 concentration that we aren't having an impact on roads and
9 people as well as Class I areas. These are considered smoke
10 sensitive targets and when our people are designing prescribed
11 fires and implementing those prescribed fires, they're taking
12 those smoke sensitive targets into consideration and
13 continually asking themselves am I going to have an impact on
14 a smoke sensitive target; and if I am, is there a way I can
15 mitigate?

16 Q. Thank you, sir.

17 A. Uh-huh.

18 Q. If I can direct your attention now to Page 5 of your
19 curriculum vitae. And I'm particularly interested in the
20 paragraph that begins "Inventory and Monitoring Activities."
21 Do you see that, sir?

22 A. Yes, uh-huh.

23 Q. Towards the end of that paragraph, in fact, the second to
24 last line of that paragraph is a parenthetical. It says,
25 "Since sulfur deposition will continue to decrease." Do you

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1 see that, sir?

2 A. Yes, I do.

3 Q. If I'm reading that correctly, it's your view that sulfur
4 deposition is decreasing and will continue to decrease in the
5 Southern Appalachians.

6 A. At the time of the writing, that is what I believed
7 because when I wrote this, we had the Clean Air Interstate
8 Rule that was in place. But I believe that the 1990 Clean Air
9 Act Amendments of -- are going to be fully implemented by
10 2010, so I do anticipate that there will be some further
11 decreases in the short-term. But I don't know that I
12 necessarily see continued decreases out in the long-term.

13 Q. I think we're all wondering about the future,
14 Mr. Jackson, but that's another question.

15 A. Yeah.

16 Q. If I heard you correctly in response to one of
17 Mr. Gulick's questions, I think you said that your current
18 estimates for the amount of sulfur deposition is something
19 between 30 to 40 kilograms per hectare?

20 A. Yeah, that would be wet plus dry sulfur deposition.

21 Q. And what areas are we looking at for that 20 -- 30 to
22 40 kilograms per hectare?

23 A. We are -- these are watersheds that we looked at. These
24 are high elevation. They're located on national forest land
25 and we thought that they would be at risk for acidic

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1 deposition. When we get above 2500 feet here in western North
2 Carolina, a large amount of that ownership, not all of it, but
3 a large amount is by the Forest Service and this area is
4 sensitive to acidic deposition based upon the elevation. We
5 have colder soils that have a lower microbial activity as well
6 as thinner soil, less soil for the acidic compounds to be
7 buffered by on there.

8 So the estimates that I came up with, to get to your
9 question, I should, when we take a sample in a stream, we
10 believe that that's an indication of the watershed above that
11 point. And we use Geographic Information Systems which is
12 computerized software for maps, and from that point we
13 estimate what is the watershed above that. And then using
14 modeling results for deposition, we estimate what the wet
15 deposition is for that. And then in order to estimate the dry
16 deposition, we use VISTAS results in terms of the relationship
17 between dry and wet deposition to come up with total
18 deposition.

19 Q. Thank you, sir.

20 A. Uh-huh.

21 Q. So we're talking about the higher elevations in the --
22 essentially in the lands under Forest Service jurisdiction.

23 A. That is correct, uh-huh.

24 Q. Which of the Forest Service Class I areas in western
25 North Carolina are we talking about?

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1 A. Linville Gorge as well as Shining Rock Wilderness and
2 Joyce Kilmer Slick Rock.

3 Q. All three of those areas are within this -- what I'm
4 going to call the band of concern to you?

5 A. Yes.

6 Q. And again, if I'm remembering correctly, you said that it
7 was your estimation that in order to start reversing the
8 current situation in terms of sulfur saturation to the soil
9 and acid neutralizing capacity in the surface waters, you need
10 to cut that 30 to 40 kilograms per hectare down to, was it 3
11 to 4 or 5 to --

12 A. Three to 5 kilograms per hectare which is a major
13 reduction, you know. And that would be to help the systems
14 that are chronically acidic or episodically acidic for them to
15 begin to turn around.

16 Q. So as you say, that's a major reduction.

17 A. That is a major reduction, yes.

18 Q. From 30 to 40 to 3 to 5.

19 A. Uh-huh.

20 Q. And that would be a yes, Mr. Jackson?

21 A. Excuse me, yes.

22 Q. We have to remember the court reporter is trying to write
23 your words down.

24 Pursuing this -- the question of, I guess, acid
25 deposition for a few moments more.

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1 A. Uh-huh.

2 Q. Again, in response to Mr. -- one of Mr. Gulick's
3 questions, I believe you talked about what I'm going to call a
4 historical pattern of sulfur deposition.

5 A. Yes.

6 Q. And sir, did you say that you take -- you did a
7 retrospective back to 1860?

8 A. That is correct, yes. And we need that in order to
9 operate the MAGIC model.

10 Q. So what we're talking about in terms of the level of
11 sulfur in the soils, it's not just a matter of what's
12 accumulated there over the last few years, it's a matter of
13 what's accumulated since the 1860s.

14 A. Yes, uh-huh.

15 Q. And of course, then I believe you testified that has an
16 impact on both your sulfur saturation and your base cations in
17 the soil and in your acid neutralizing capacity in the surface
18 waters.

19 A. That is correct.

20 Q. Just so the record is clear, hectare is a metric measure
21 of land area.

22 A. It is, yes.

23 Q. It's somewhat equivalent to an English measure of an
24 acre.

25 A. It is. If we talk about 20 pounds of sulfur per hectare,

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1 it's almost -- I mean, 20 kilograms per hectare, if you do the
2 conversion, it's almost about 20 pounds per acre also.

3 Q. Okay. For those of us who are metrically challenged, I
4 thank you.

5 When we're talking about this kind of reduction,
6 Mr. Jackson, over what period of time would this reduction
7 need to be made in order -- before you started seeing a change
8 in the base cation representation or the mobility of the
9 aluminum or improvements with surface water ANC?

10 A. The modeling that we did that I gave those estimates from
11 assumes that the reductions begin in 2009 and they're
12 completed by 2018, and then we see the benefits by the year
13 2100.

14 Q. So that's 2100 from completing the reductions at 2018.

15 A. Yes.

16 Q. So some 80 years, roughly, into the future.

17 A. Yeah, but these types of questions, of course, are going
18 to be policy type questions that develop, you know.

19 Q. I understand that. And again, if I understood you
20 correctly, Linville Gorge's situation is, in my term,
21 complicated by its geology.

22 A. It is, uh-huh.

23 Q. Because it's -- it was naturally base poor?

24 A. It is. It's among the most sensitive class in terms of
25 sensitivity in terms of its geology, or we use the term

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1 lethology also.

2 Q. And I think that you made mention of doing retrospective
3 modeling for Linville Gorge.

4 A. Yes.

5 Q. And what did you mean by that, sir?

6 A. One of the questions that we need to try and understand
7 is if we go back to 1860, you know, what was the ANC of
8 Linville Gorge? Is it reasonable to assume that an ANC of 50
9 is possible or has ever been present at Linville Gorge? And
10 when we look at the retrospective studies going backwards for
11 Linville Gorge, our estimate is that the ANC there was about
12 30.

13 Q. This is in 1860 the ANC was about 30?

14 A. That's right. So it was quite -- it was low. It was
15 below 50. And so it's not reasonable to assume that Linville
16 Gorge can attain an ANC of 50 in the future.

17 Q. And 1860, of course, would be before the industrial
18 revolution really took hold in the south.

19 A. Yes, uh-huh.

20 Q. Mr. Jackson, if we can just explore for a moment this
21 concept of sensitive to acid deposition.

22 A. Uh-huh.

23 Q. And if we can just take -- look at Linville Gorge as at
24 least an example for the moment.

25 A. Okay.

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1 Q. Sir, my understanding of sensitive means that with a
2 small change, you have -- small change in input, you have a
3 major change in result. Is that a reasonable way to think of
4 sensitivity?

5 A. Well, it depends upon how you're using it. In the case
6 of Linville Gorge, that would not be an appropriate way to
7 describe sensitivity.

8 Q. Well, how would you describe it, sir?

9 A. In that -- in terms of sensitivity, it does not have the
10 ability to offset acid inputs that are coming in. It will not
11 have a large response to changes because of the amount of
12 sulfur that's been absorbed in the soils there. It's near
13 maximum sulfur absorption capacity.

14 Q. Would it be perhaps more accurate to speak of Linville
15 Gorge as having been sensitive at one point in the past and
16 now is no longer sensitive?

17 A. Because the -- it no longer has buffering capacity?

18 Q. Yes, sir.

19 A. The addition of sulfur in that system, what we would
20 anticipate is that if we're not at the maximum capacity that
21 the soils can retain at this time, it will make it there. And
22 then any calcium that becomes available, calcium, magnesium,
23 potassium, will be removed from that site. So the loss of
24 base cations will be those that become available from the
25 overstory.

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1 Q. All right, sir. If I could ask you, please, to look at a
2 document. We're going to turn to the SAMI final report.

3 A. Okay.

4 Q. Which is Plaintiff's Exhibit Number 1.

5 A. Uh-huh.

6 Q. Ms. Gillen is going to help me again with this.

7 I'd like to direct your attention to Figure 6.3 which
8 appears on Page 6.6 of the hard copy of the SAMI report.

9 Do you see that in front of you on the screen,
10 Mr. Jackson?

11 A. Yes, I do.

12 Q. And I believe this -- as the heading shows, this is the
13 Percentage of Stream Lengths in the SAMI Region by ANC Class.

14 A. That is correct.

15 Q. And it's various relations are depending on the ANC
16 levels of those stream lengths.

17 A. That is correct.

18 Q. And if I'm reading this correctly, I'm going to say a
19 little bit better than 66 percent of the stream lengths have
20 an ANC greater than a hundred and 50.

21 A. That is correct.

22 Q. And another 27 percent have ANC somewhere between 51 and
23 a hundred and 50.

24 A. That is correct.

25 Q. And then we have the smaller representations for ANC

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1 below 50. Or 50 and below, I should say.

2 A. Correct, and that's what I've talked about mainly today,
3 uh-huh.

4 Q. Is the 50 and below.

5 A. Yes.

6 Q. I think -- you testified about the, what I'm going to
7 call the implications to the aquatic biota --

8 A. Uh-huh.

9 Q. -- of ANC at 50 and below.

10 A. That is correct.

11 Q. All right, sir.

12 And still looking at the exhibit -- Plaintiff's Exhibit
13 number 1, the SAMI report. If I could direct your attention
14 to Page 4.20. This is what I'm going to call the conclusions
15 page for the visibility chapter.

16 A. Okay, uh-huh.

17 Q. Is that correct?

18 A. Yes, this says --

19 Q. I'm going to ask Ms. Gillen to move the page down so we
20 can see the uncertainties.

21 A. Uh-huh.

22 Q. And Mr. Jackson, can you -- do you see that paragraph,
23 that first paragraph under uncertainties clearly enough to
24 read it for us?

25 A. "The greatest source of uncertainties comes from the

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1 cumulative uncertainties in the emissions inventory and the
2 atmospheric model assumptions and performance. The greatest
3 confidence is in sulfate and organic particles, intermediate
4 for elemental carbon and soil, and least for nitrate and
5 ammonium."

6 Q. And those are uncertainties that affect SAMI's analysis
7 of visibility impacts.

8 A. They do, uh-huh.

9 Q. You mentioned control technologies for controlling the
10 emission of SO₂ in your testimony in response to Mr. Gulick.

11 A. Yes.

12 Q. And would it be correct to say that one of the control
13 technologies is what we were referring to as flue gas
14 desulfurization or scrubbers?

15 A. Yes, uh-huh.

16 Q. So installing a scrubber on a power plant would have,
17 obviously, a significant impact on how much SO₂ that plant
18 emitted.

19 A. That is correct. My experience, you know, talking about
20 these things, we would expect at least a 90 percent reduction
21 in sulfur dioxide emissions.

22 Q. From a well-functioning scrubber.

23 A. Right. And hopefully higher.

24 Q. And hopefully...

25 A. Higher.

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1 Q. And hopefully higher.

2 A. Or a greater amount, uh-huh.

3 Q. Would also using lower sulfur coal be one of the methods
4 that you have -- would look to to reduce the emissions of
5 sulfur dioxide?

6 A. Yes. And I know of many facilities that have used that
7 as one of their options.

8 Q. Mr. Jackson, Mr. Gulick asked you towards the end of your
9 examination about Blue Ridge Paper and you responded about the
10 letter that the Forest Service sent in.

11 MR. FINE: If I could please ask Ms. Gillen to put
12 the document that's been marked for identification as
13 Defendant's Exhibit 435 on the screen.

14 Your Honor, that exhibit appears in book number 18
15 of TVA's exhibits.

16 Q. Do you see the document that's been marked for
17 identification as Defendant's Exhibit 435, Mr. Jackson?

18 A. I do see the document in front of me.

19 Q. Is this the letter that you were referring to in your
20 testimony to Mr. Gulick?

21 A. Yes, it is.

22 Q. What role, if any, did you have in the preparation of
23 this letter and the enclosure to the letter?

24 A. I produced the original draft of the letter and made
25 modifications that forest supervisor Marisue Hilliard

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1 requested.

2 Q. What about the enclosure?

3 A. Yes, I also was the original author, if I can say, of
4 producing that document.

5 Q. And just so it's clear in the record, what were the
6 circumstances or why did the Forest Service submit this letter
7 to the North Carolina Department of Environmental and Natural
8 Resources, Division of Air Quality?

9 A. We wanted to go on record in terms of our comments
10 regarding the regional haze SIP, and in particular we wanted
11 to go on public record of our concern and our identification
12 of the potential impacts that we believe that Blue Ridge Paper
13 is having on visibility at Shining Rock Wilderness, and that
14 was based upon some modeling that I had done.

15 Q. And I believe, sir, that this letter was sent to the
16 division -- to Mr. Keith Overcash at the Division of Air
17 Quality in October of 2007?

18 A. That is correct.

19 MR. FINE: Your Honor, I'd ask that Defendant's
20 Exhibit 435 be admitted into evidence.

21 THE COURT: Let that be admitted.

22 (Defendant's Exhibit Number 435 was received into
23 evidence.)

24 Q. Just a couple of points I'd like to get your help with on
25 this -- the document that's been admitted into evidence as

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1 Defendant's Exhibit 435.

2 A. Uh-huh.

3 Q. If we could turn to the enclosure, which is the second
4 page of the -- of the exhibit. And if I could direct your
5 attention to paragraph 3, towards the bottom of the page. Do
6 you see that, sir?

7 A. Yes, I do.

8 Q. And if I'm looking at this correctly, the Forest Service
9 through you were commenting on the fact that Blue Ridge Paper
10 is projected to have about 10,150 tons of SO₂ emissions in
11 2018.

12 A. That is correct, based upon data compiled by VISTAS.

13 Q. So that's derived from the VISTAS inventory?

14 A. Yes, it is.

15 Q. And I believe you already discussed that this was going
16 to have, based on the modeling you did, using the CALPUFF
17 model, that these emissions were having impacts on
18 visibilities at Shining Rock.

19 A. Yes, that is correct.

20 Q. Using -- what was the -- what was the quantification, if
21 any, for the visibility impacts at Shining Rock from Blue
22 Ridge Paper?

23 A. If I understand your question correctly, we looked at the
24 number of days of a change in something called deciview,
25 another visibility metric that I haven't talked about. And

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1 with that, one of the criteria that we looked at is how many
2 times -- or how many days a year do we have 1 deciview or
3 greater change in visibility.

4 Q. And as you say, deciview is a measure of visibility?

5 A. It is. And it's -- the idea is that it's equivalent in
6 the idea of the decibel scale that so many people are familiar
7 with in terms of sound. And a 1 deciview change by many
8 scientists, and we've also used with our work with new
9 sources, a 1 deciview change is considered a perceptible
10 change to most members of the public.

11 Q. And I believe that deciviews are used by the
12 Environmental Protection Agency in the Regional Haze Rule?

13 A. They did use deciview, that's correct.

14 Q. And so you looked at the visibility impacts of Blue Ridge
15 Paper's emissions on visibility at Shining Rock.

16 A. That is correct.

17 Q. And what -- what did you conclude from your modeling?

18 A. Based on our modeling, it appears that there is greater
19 than 200 days a year that visibility could be impaired 1
20 deciview or greater at Shining Rock Wilderness, and that's
21 just looking at just Blue -- the emissions from Blue Ridge
22 Paper.

23 Q. Was there a chance of their having a greater visibility
24 impact at Shining Rock?

25 A. Well, it depends upon the meteorological data that you

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1 have. Excuse me, yes. That was 200 days greater than 1
2 deciview, if I understand your question. But the maximum that
3 we measured, I believe there was at least one time period
4 where we estimated perhaps a 30 deciview change.

5 Q. Thirty deciview change.

6 A. Yes.

7 Q. I believe, if I'm reading this correctly, and this is at
8 the very bottom of the page that I'm looking at. I believe
9 you said, "Making significant sulfur reductions at the Blue
10 Ridge Paper facility alone may improve visibility more than 6
11 deciviews."

12 A. That is correct.

13 Q. What did you mean by that, sir?

14 A. I would need to go back and look at my work, but probably
15 on average it would improve by 6 deciviews because the
16 Regional Haze Program was looking at average visibility not
17 just the worst visibility.

18 Q. I know that your -- that your document -- that your
19 comments were talking about impacts at Shining Rock, but are
20 you aware of the visibility impacts from Blue Ridge Paper at
21 other Class I areas in western North Carolina?

22 A. I did not look at modeling results for other Class I
23 areas in this exercise.

24 Q. But are you aware whether Blue Ridge Paper is impacting
25 other Class I areas?

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1 A. I don't have any modeling results for that particular
2 source impacting other ones. It would just be, what can I
3 say, conjecture on my part, you know, that it probably is
4 impacting other Class I areas, also.

5 Actually, the BART analysis that was done for Blue Ridge
6 Paper, excuse me, I believe that it showed impacts to Great
7 Smoky Mountains National Park. But that was not all the
8 emission sources from Blue Ridge Paper. That was just the
9 BART eligible sources from Blue Ridge Paper.

10 Q. Just so that it's clear on the record, what's the
11 difference between a BART eligible source and a nonBart
12 eligible source?

13 A. Well, the Clean Air Act Amendments of 1977 first talks
14 about the BART sources. And I believe it's -- the sources
15 that were included are -- in the BART analysis had to be in
16 certain categories so it wasn't all sources of pollution. And
17 they had to be in existence probably around 1962 or 61,
18 something like that. So it doesn't -- there's a time period
19 and I can't -- I don't remember the exact dates, but there is
20 a time period. And those sources that are in those
21 categories, those are the ones that are BART eligible.

22 And I think the idea of this is that, you know, even
23 Congress recognized in 1977 there was visibility impacts
24 occurring at that time, and this was one of the ways to start
25 dealing with visibility improvement. Hopefully, the idea is

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1 that these BART sources were eventually also, as well as older
2 sources, eventually were going to be -- their boilers were
3 going to be replaced and then they would be subject to new
4 source -- new source review standards. But many of these
5 sources are still around today.

6 Q. So if I'm understanding you correctly, Mr. Jackson, some
7 of the boilers at Blue Ridge Paper are old or old enough to
8 fall outside of the BART analysis?

9 A. That is correct. And two -- I believe two of the boilers
10 are original to the plant and I believe the plant dates about
11 1920.

12 Q. And what's the -- are those two of the larger or smaller
13 boilers, if you know?

14 A. In terms of sulfur dioxide emissions, they're the larger
15 ones.

16 Q. And if I can ask Ms. Gillen to show you the last page of
17 the enclosure.

18 We're talking about Blue Ridge Paper. And this is -- if
19 I could direct your attention to the text that's below the
20 chart that you have there showing visibility impacts. If I am
21 reading this correctly, the Forest Service through you is
22 telling the Division of Air Quality that we, referring to the
23 Forest Service, "believe emissions reductions at Blue Ridge
24 Paper should be accomplished before 2018 because emissions
25 from this facility clearly have a significant impact to

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1 visibility at Shining Rock Wilderness." Is that correct, sir?

2 A. That is correct.

3 Q. And at the very end of that paragraph, we, again
4 referring to the Forest Service, "are recommending a
5 facility-wide emission reduction plan be developed by 2013 and
6 the emission control measures be fully implemented before
7 2018."

8 A. That is correct.

9 Q. And if I'm understanding -- if I remember correctly, 2018
10 is critical because of the Regional Haze Rule where you're
11 supposed to be measuring your reasonable progress towards the
12 ultimate goal.

13 A. Yes. It's our next target date that we're looking at.

14 Q. All right, sir.

15 Oh, just by the way, to your knowledge, is the Progress
16 plant here in Asheville also impacting Shining Rock
17 visibility?

18 A. I have not performed any modeling -- or don't know of any
19 modeling that has been accomplished for the Skyland plant. So
20 it would just be conjecture.

21 MR. FINE: All right, sir. Thank you.

22 A moment, if you please, Your Honor.

23 THE COURT: All right, sir.

24 (Co-counsel conferred.)

25 MR. FINE: Your Honor, that's all the questions I

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WILLIAM JACKSON - REDIRECT

1 have of this witness. Thank you.

2 MR. GULICK: I have just a few, Your Honor.

3 THE COURT: All right.

4 REDIRECT EXAMINATION

5 BY MR. GULICK:

6 Q. Mr. Jackson, I'd like to go back to Exhibit 1, Page 53.

7 MR. GULICK: Figure 3.11, Your Honor. It's Exhibit
8 1, Page 53.

9 Your Honor, this is back to a more familiar chart,
10 3.18 of the hard document, I think.

11 Is that 3.18?

12 THE COURT: Okay. We have it now.

13 Q. And Mr. Jackson, looking here at the SAMI evaluation of
14 the Annual Aerosol Response here, is it your understanding
15 that all of the -- when we're looking at North Carolina,
16 there's a light blue bar bar that represents the benefit
17 through the achievement of reductions in North Carolina, a
18 10 percent reduction in North Carolina?

19 A. Yes, uh-huh.

20 Q. And is that with the sources or would the source from
21 Blue Ridge Paper be included within that North Carolina SO₂
22 inventory?

23 A. Yes, because this includes all sources of SO₂.

24 Q. And is it not still the case that the -- in this
25 particular bar, that the Tennessee bar, the bar showing the

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1 pink or salmon color from Tennessee is considerably larger
2 than that for North Carolina?

3 A. It is considerably larger.

4 Q. And I just want to ask with respect to the Blue Ridge
5 Paper again. Is it your understanding that North Carolina
6 went through the factor analysis that's called for under the
7 Regional Haze Rule in considering whether controls needed to
8 be required now for Blue Ridge Paper?

9 A. Yes, they did go through that analysis.

10 Q. And are you satisfied that they performed that analysis
11 correctly?

12 A. Yes.

13 Q. At this time?

14 A. Uh-huh.

15 Q. And it's your recommendation that it will be reviewed
16 again in 2013.

17 A. That is correct, uh-huh.

18 Q. To look for changes -- for action before 2018.

19 A. Yes. I mean, I think -- you know, I'd have to look in
20 our letter again because that is what we committed to. But we
21 would hope that plans would be in place by 2013 so that they
22 can be implemented before 2018 so you can see the measure --
23 or see a measured response.

24 Q. And you're expecting to work with the Division of Air
25 Quality in that connection.

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WILLIAM JACKSON - REDIRECT

1 A. Yes, if we're invited we will participate.

2 Q. And I believe you indicated before that you were
3 satisfied at the moment -- at this time with the response that
4 North Carolina has to this particular facility.

5 A. Yes, we are satisfied.

6 MR. GULICK: I have no further questions, Your
7 Honor.

8 THE COURT: Further cross?

9 MR. FINE: Nothing further, Your Honor. Thank you.

10 THE COURT: All right. Marshal, take a recess until
11 tomorrow morning at 9 o'clock.

12 (Evening recess at 6:02 p.m.)

13 UNITED STATES DISTRICT COURT

14 WESTERN DISTRICT OF NORTH CAROLINA

15 CERTIFICATE OF REPORTER

16

17

18 I certify that the foregoing transcript is a true
19 and correct transcript from the record of proceedings in the
20 above-entitled matter.

21

22 Dated this 14th day of July, 2008.

23

24 s/Cheryl A. Nuccio
Cheryl A. Nuccio, RMR-CRR
25 Official Court Reporter

Cheryl A. Nuccio, RMR-CRR (704)350-7494